

Fig. 1

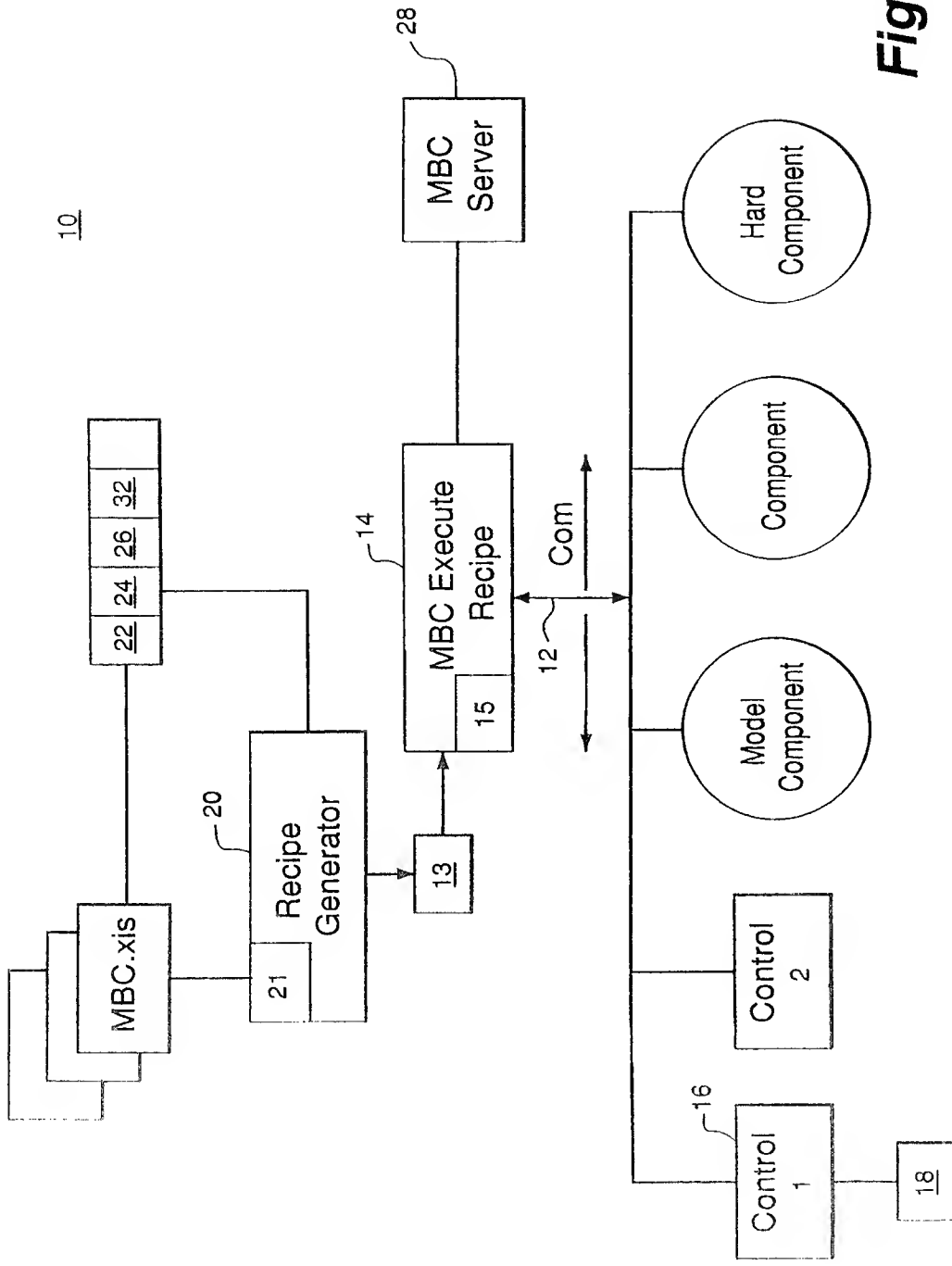


Fig. 2

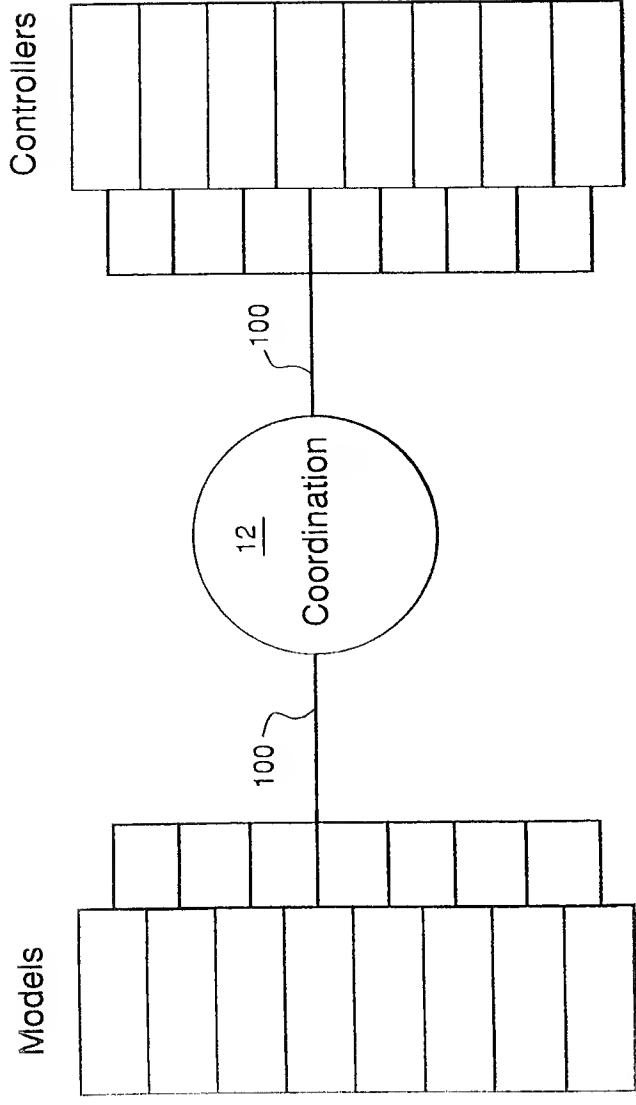
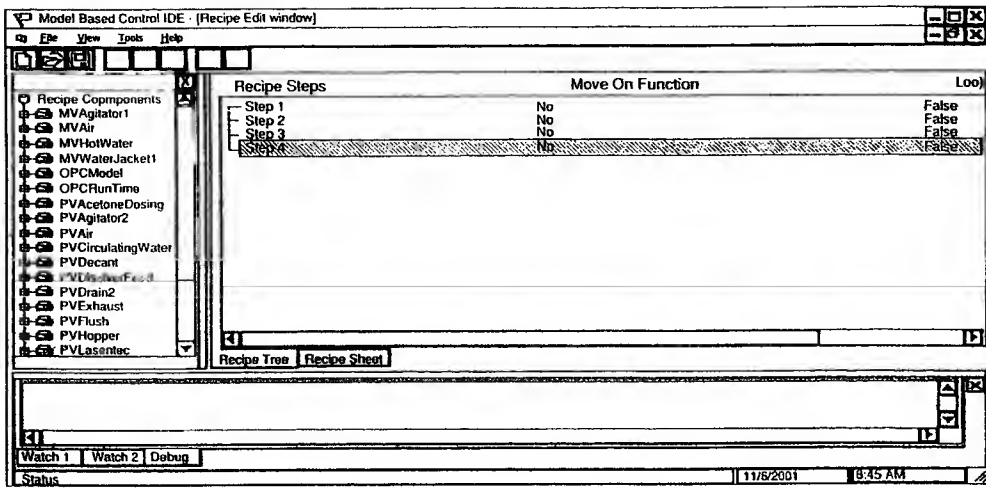


Fig. 2A



Recipe Edit Window

Recipe Steps	Move On function	Loop	LoopTime	StepTime
Step 1	No	False	10	100
Step 2	No	False	0	0
Step 3	No	False	0	0

Recipe Tree | Recipe Sheet

Recipe Step Detail

Step No: Description:

☒ Pre-Process Step

☒ Post-Process Step

Component Commands

A

V

+

-

Loop Control

Move On:

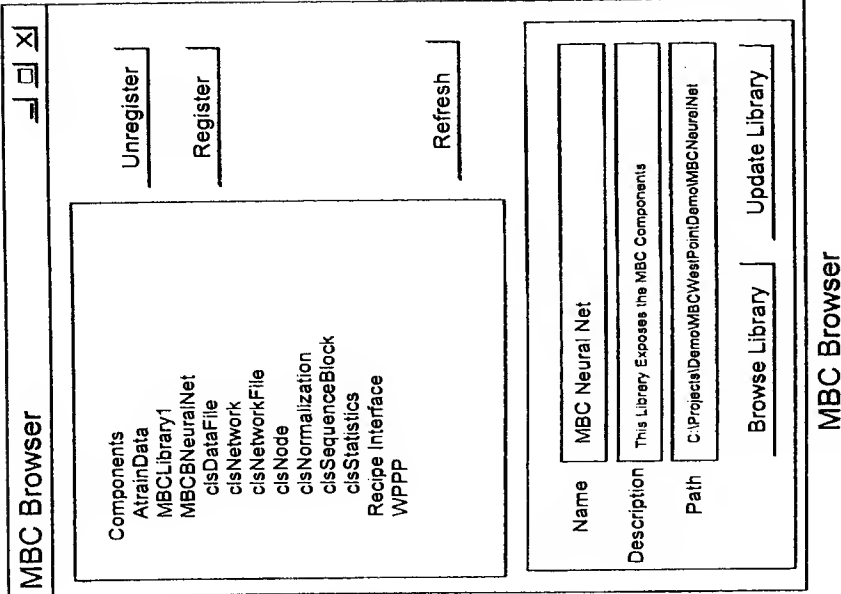
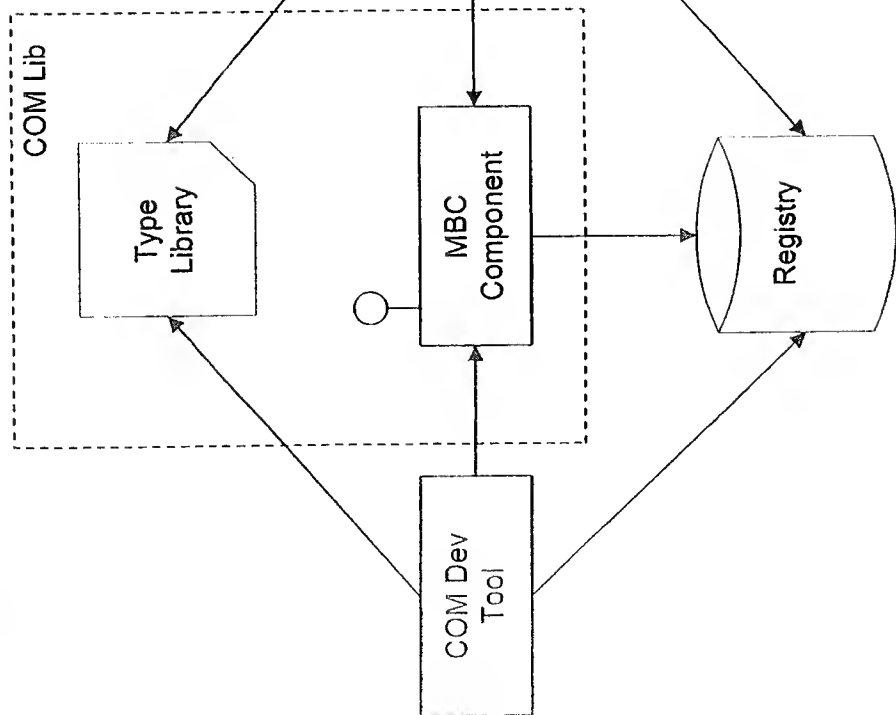
Loop Time:

Step Time: Units: ☒

First Prev Next Last

Fig. 3

Fig. 4



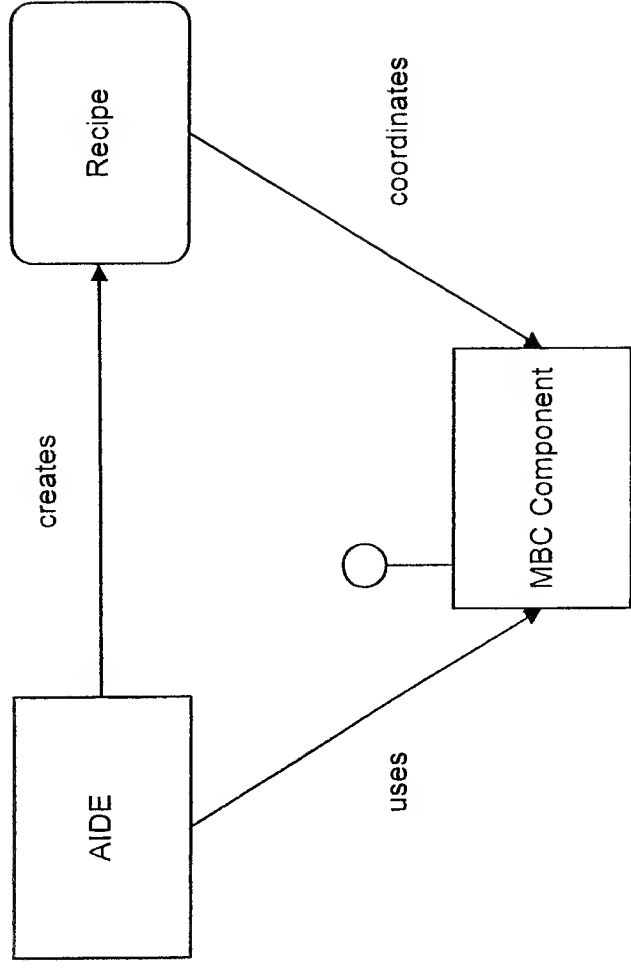
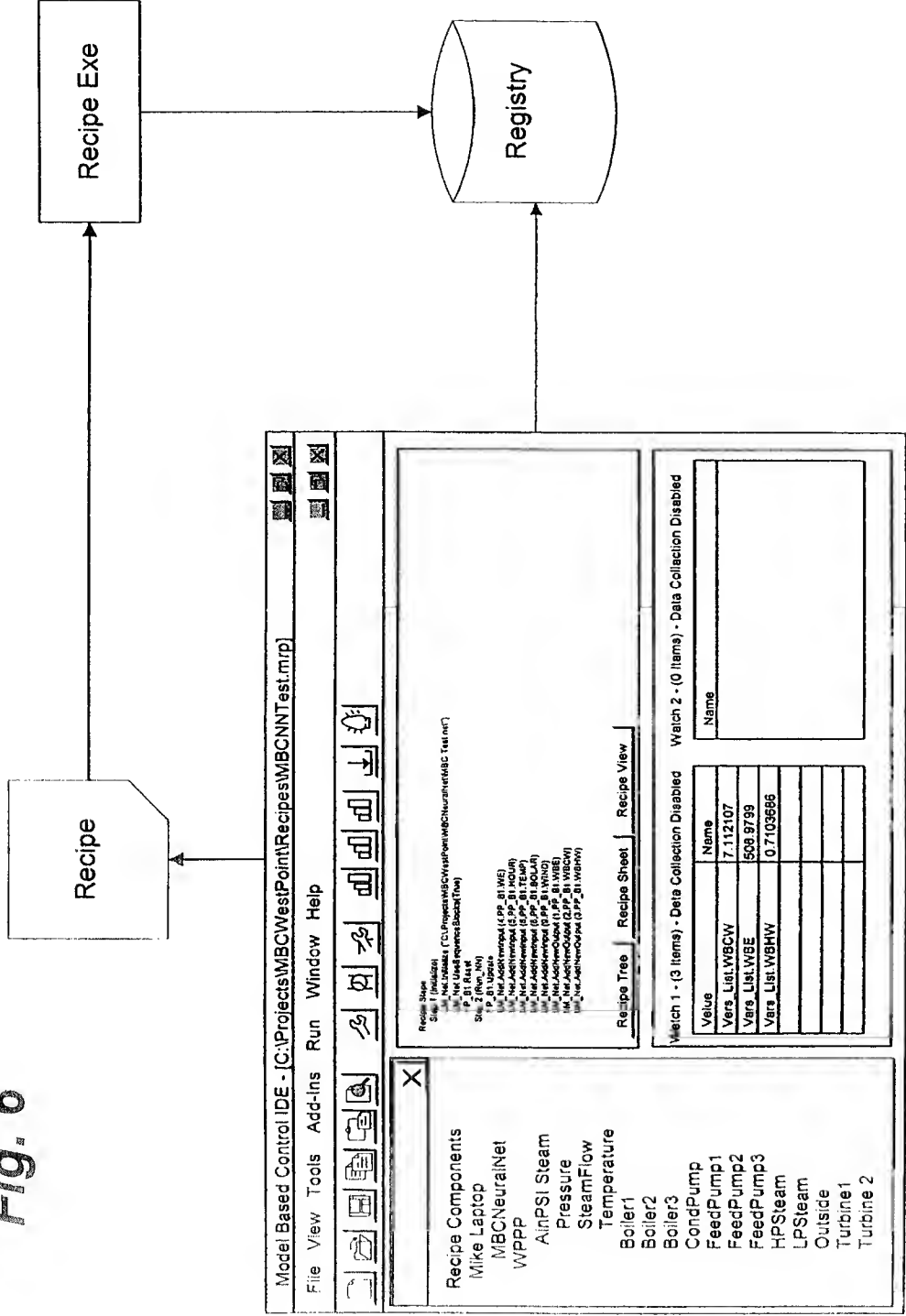


Fig. 5

Fig. 6



AIDE

Fig. 7

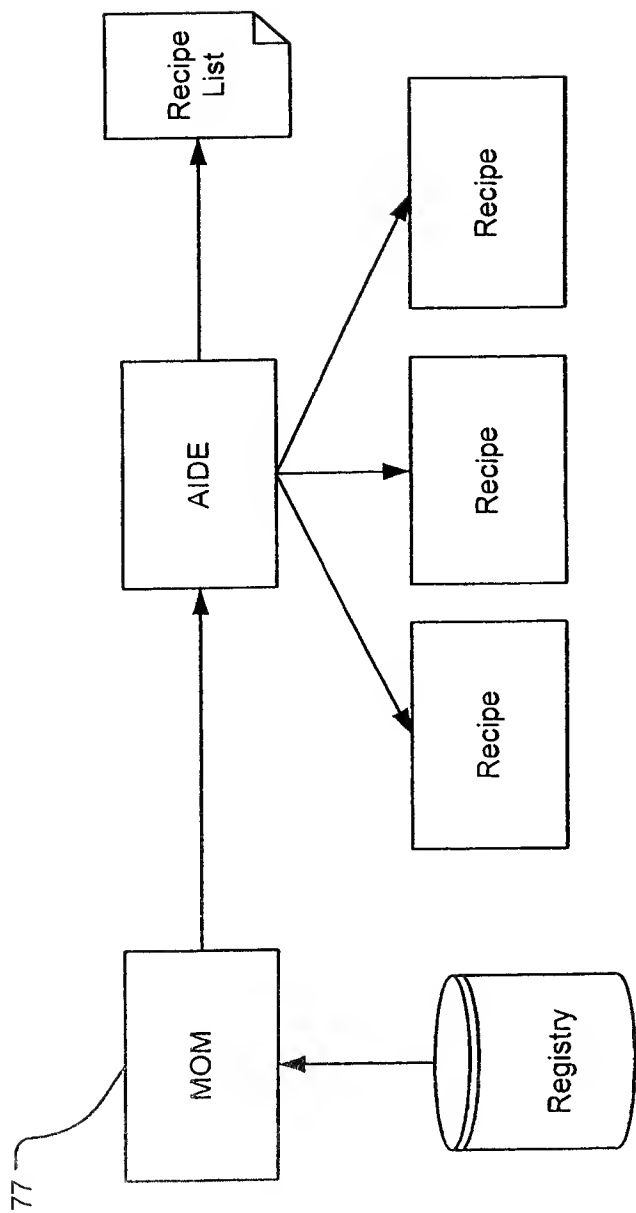


Fig. 8

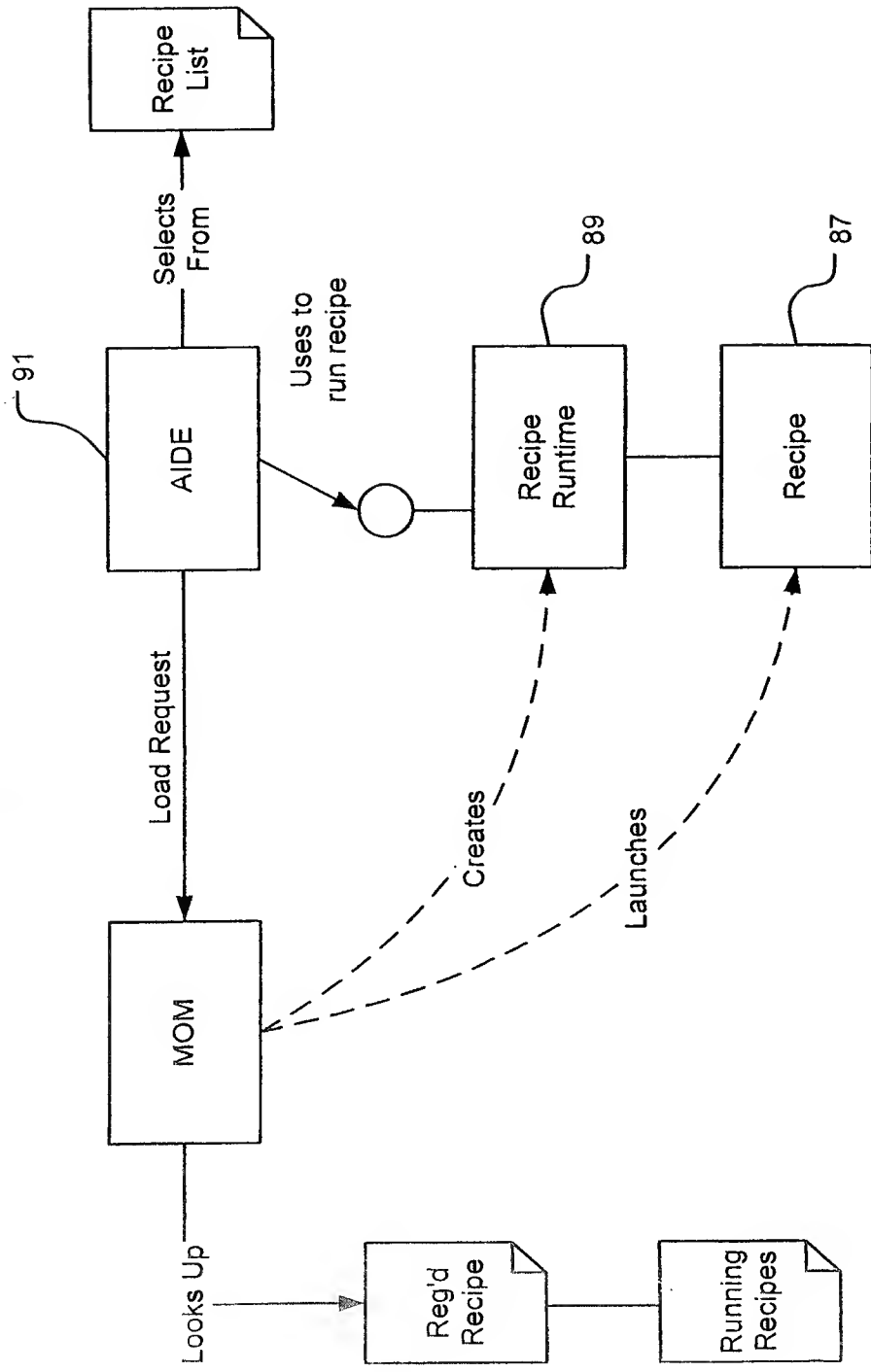


Fig. 9

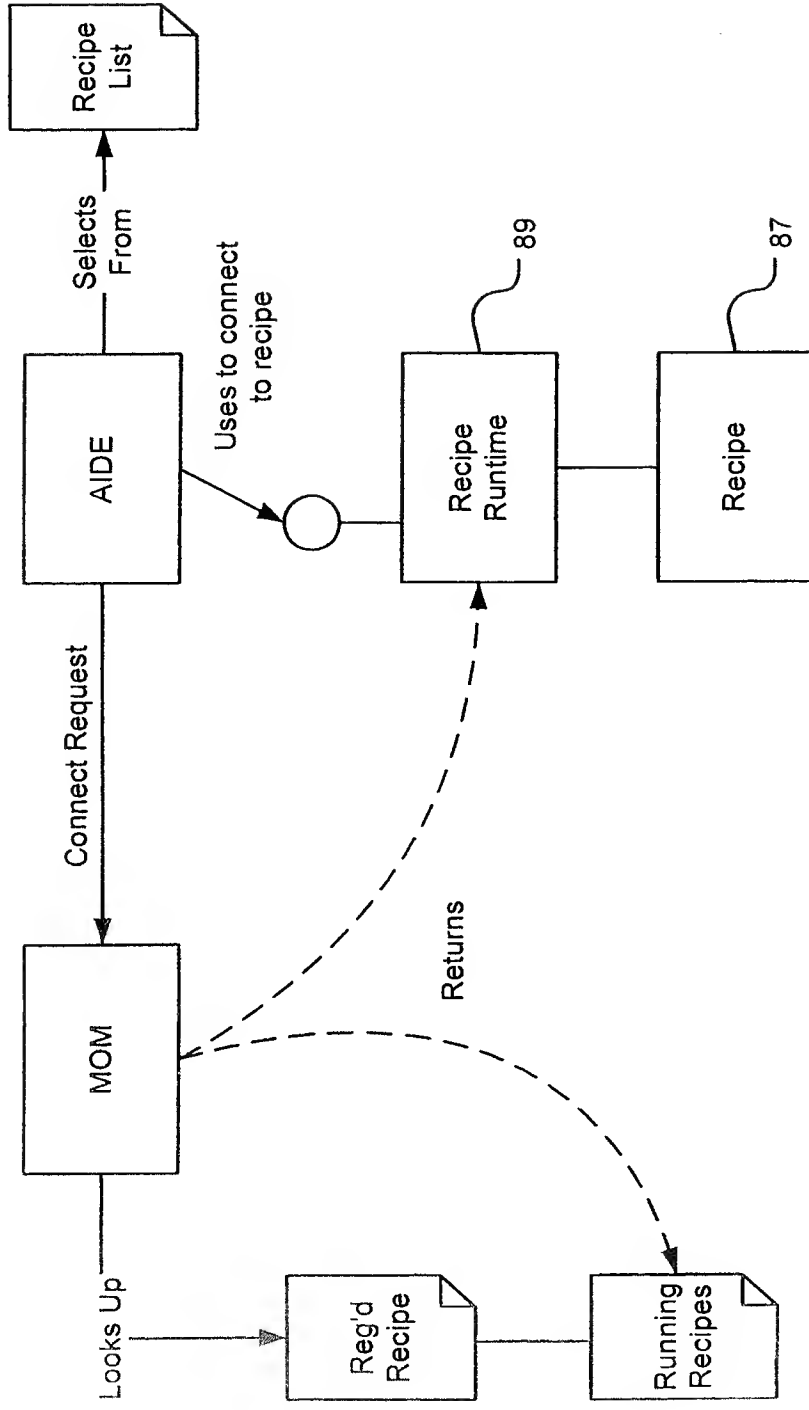


Fig. 10

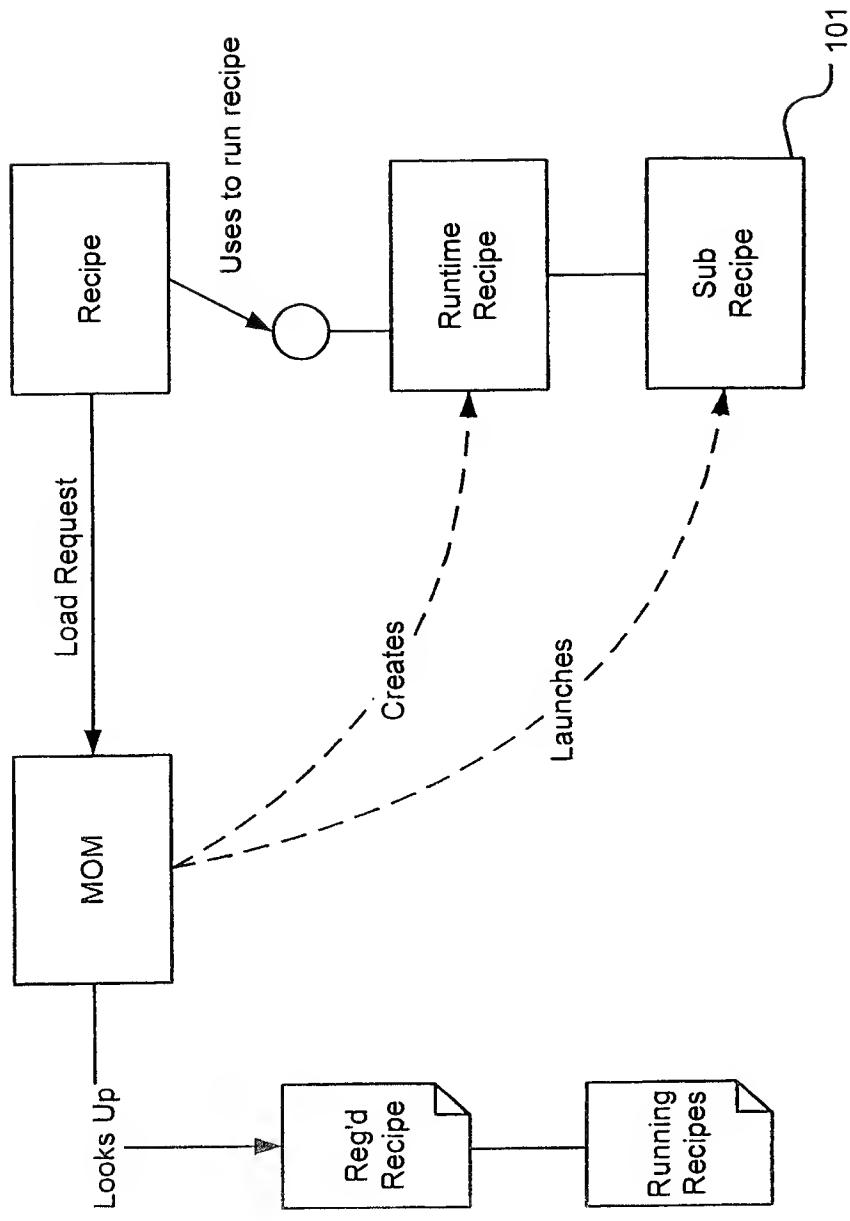


Fig. 11

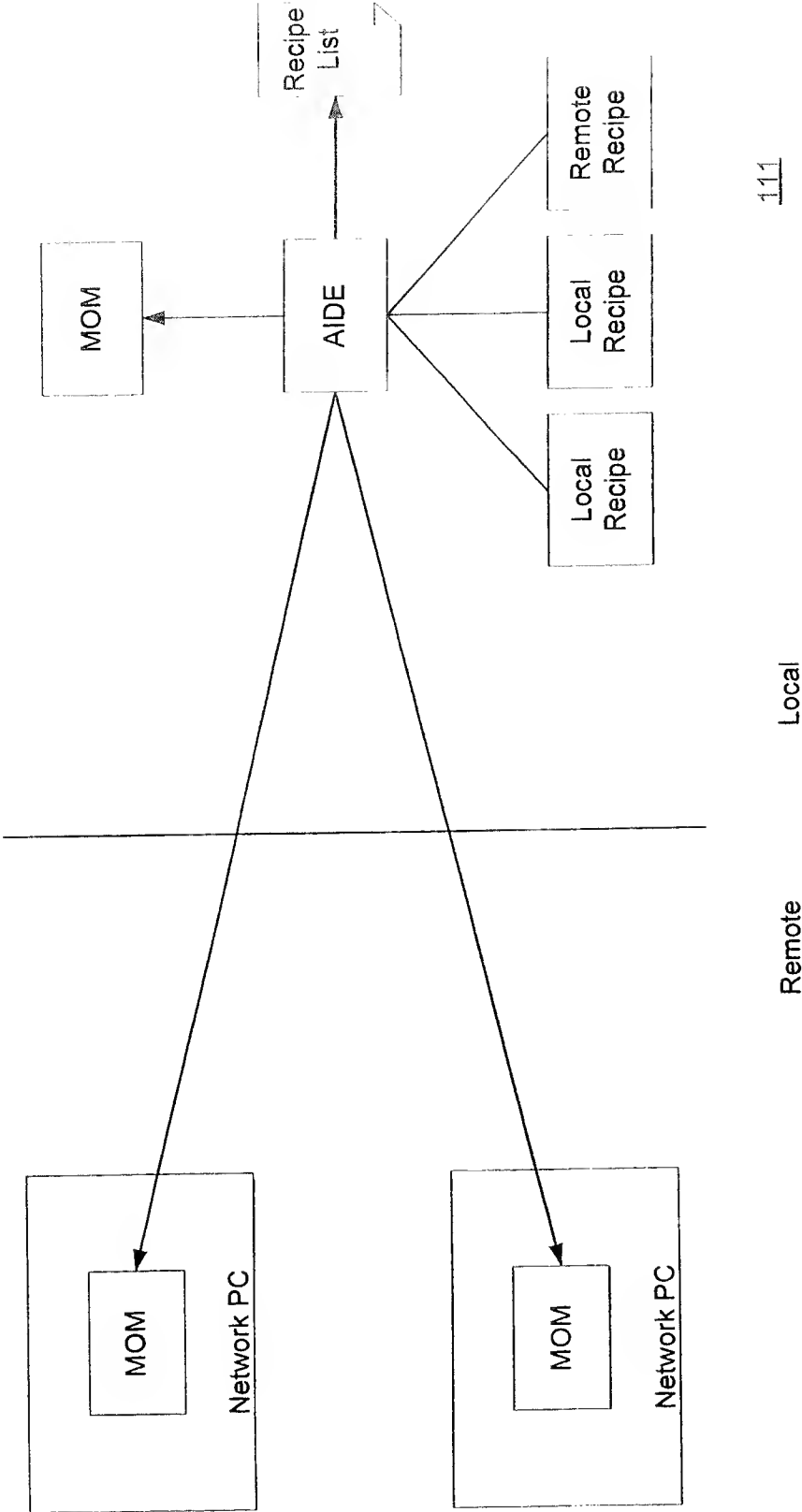


Fig. 12

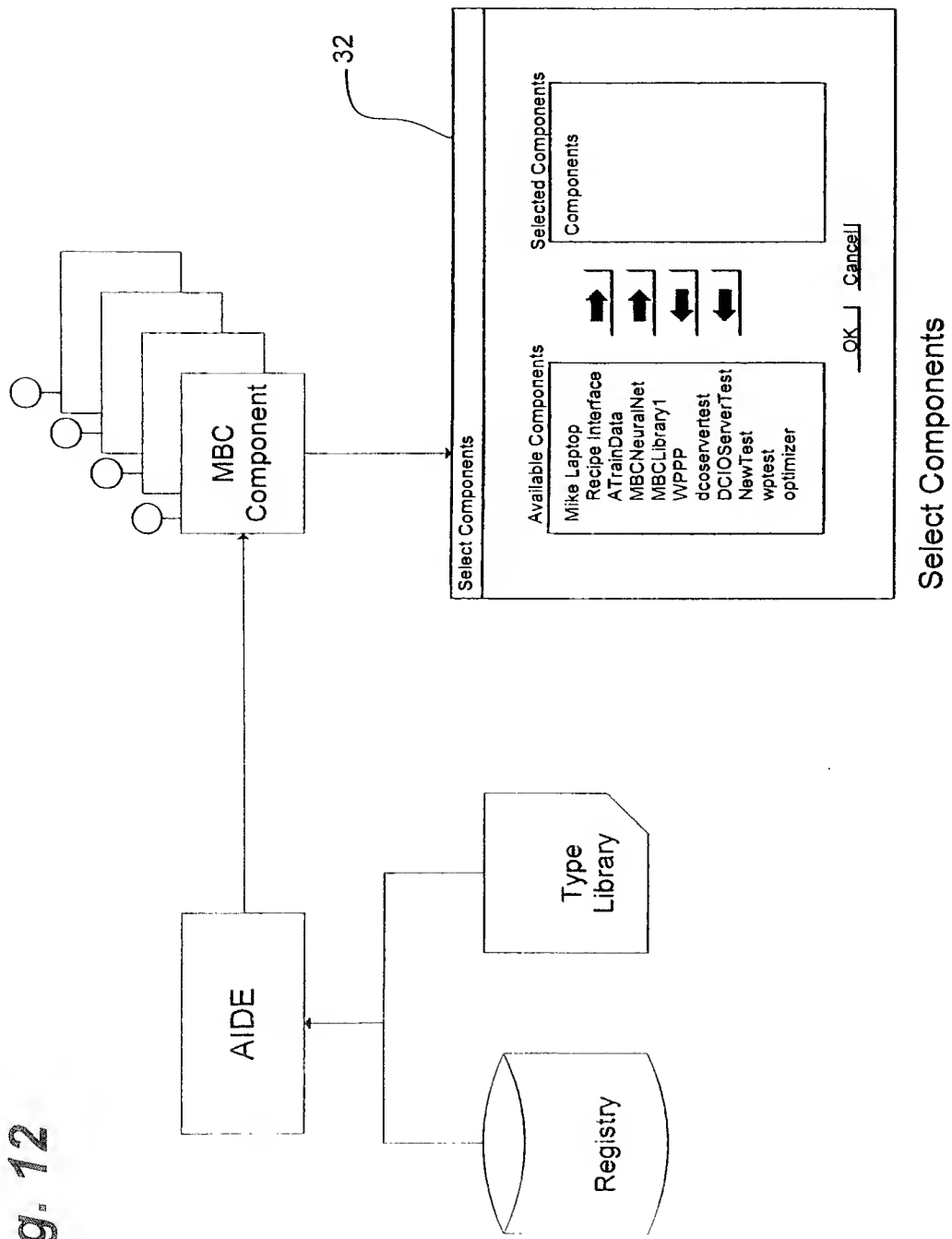


Fig. 13

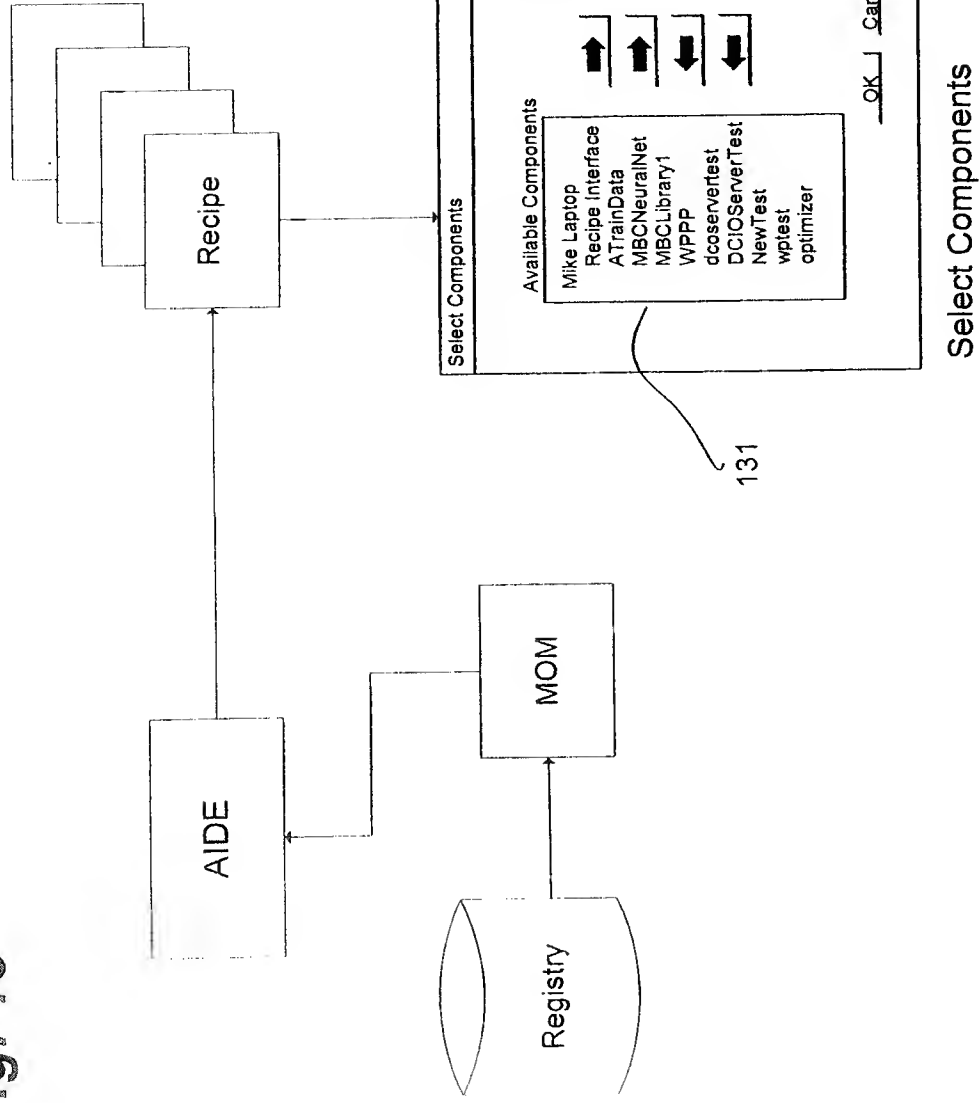
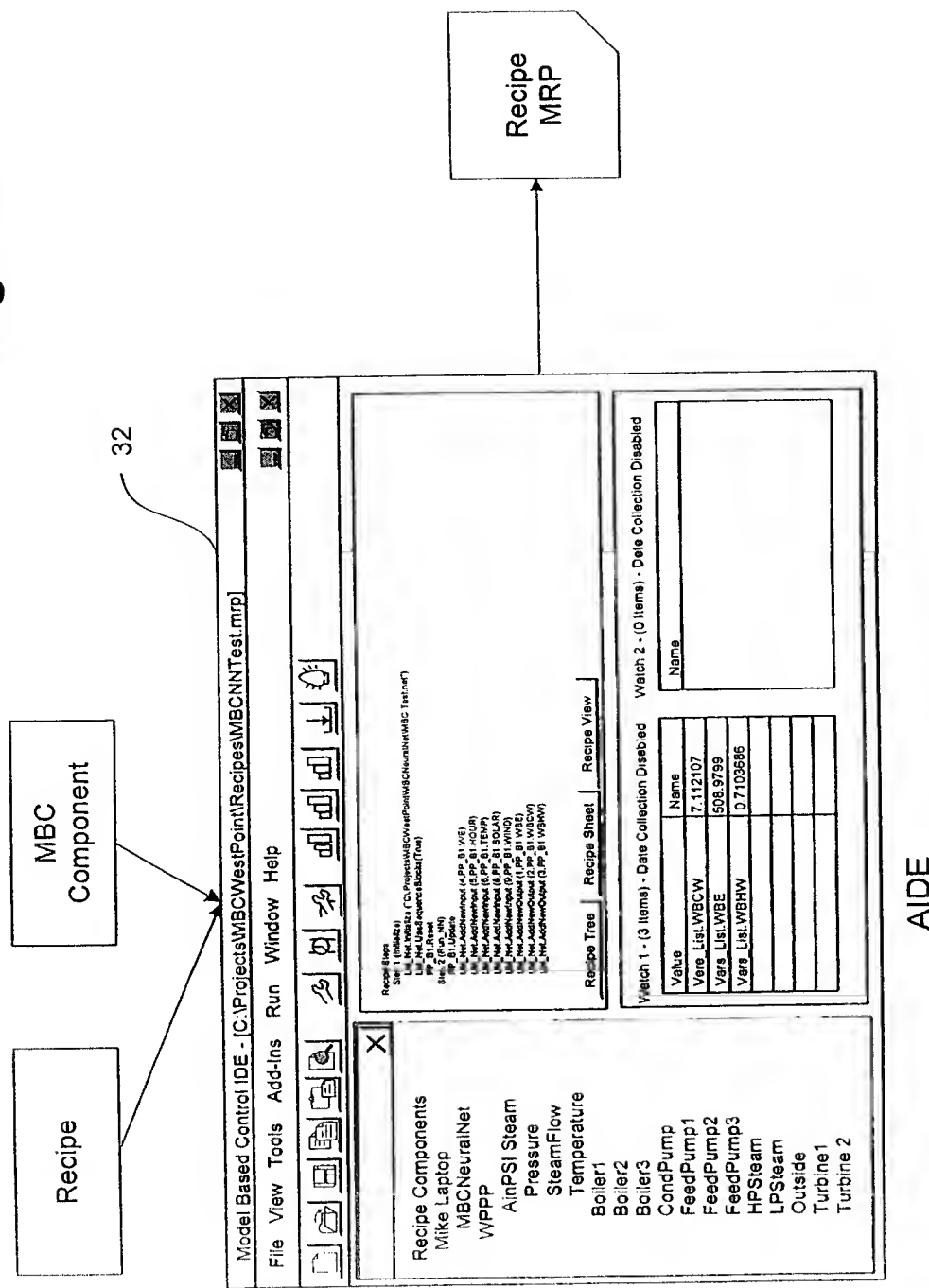


Fig. 14



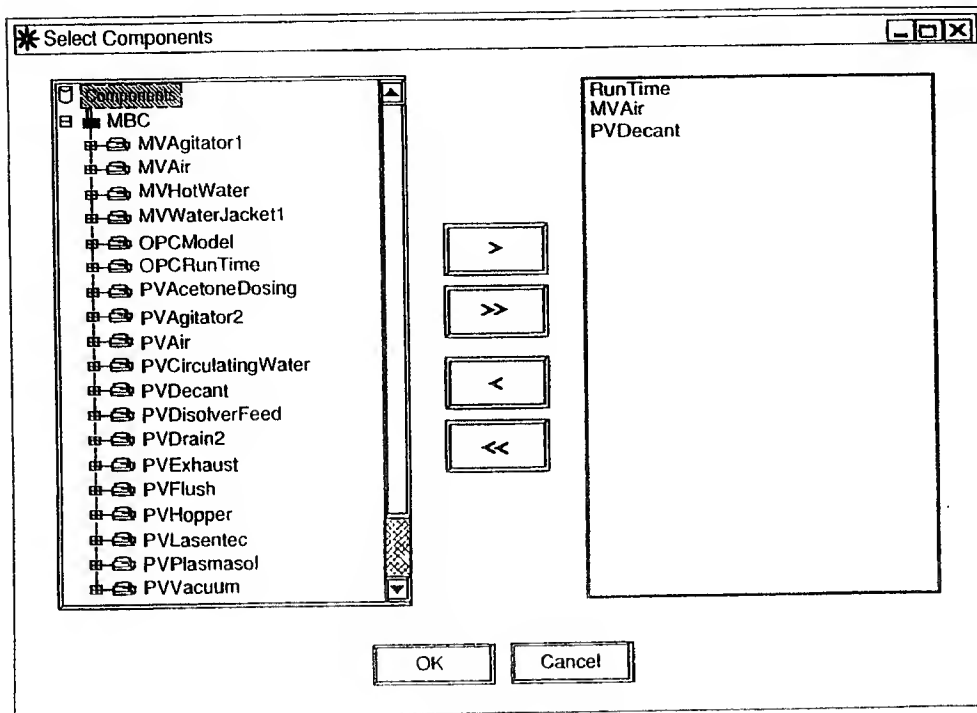
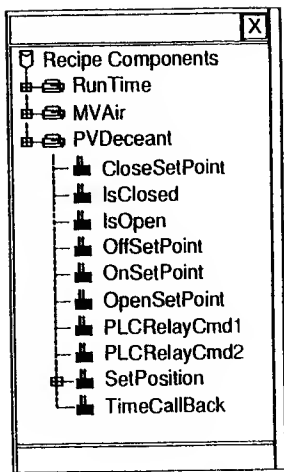
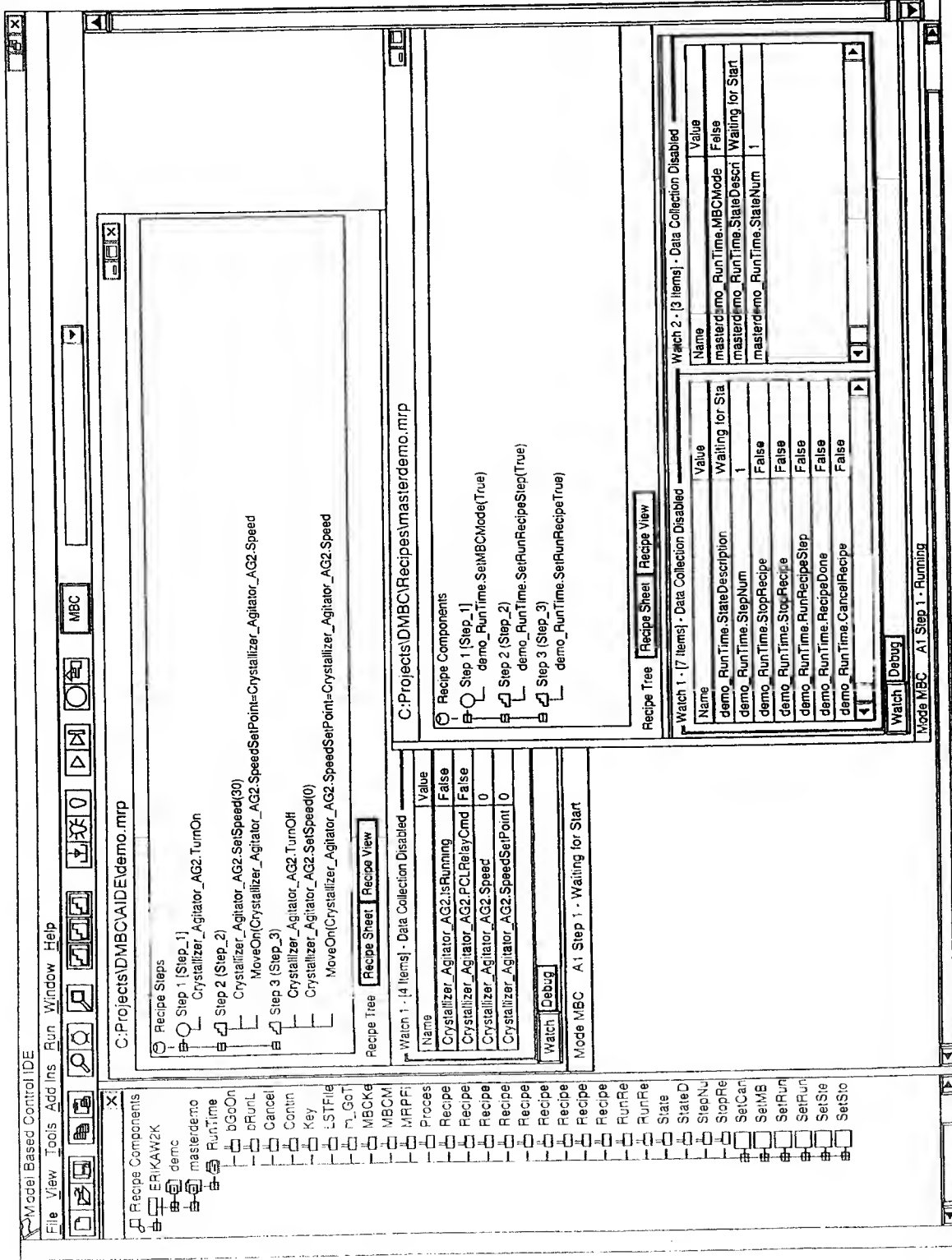


Fig. 15



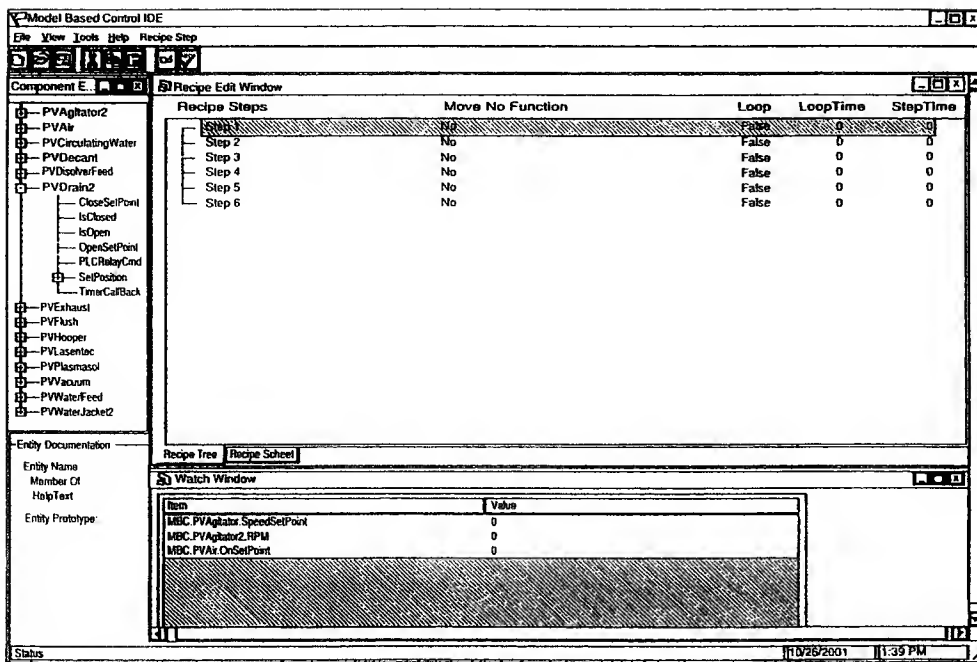


Fig. 17

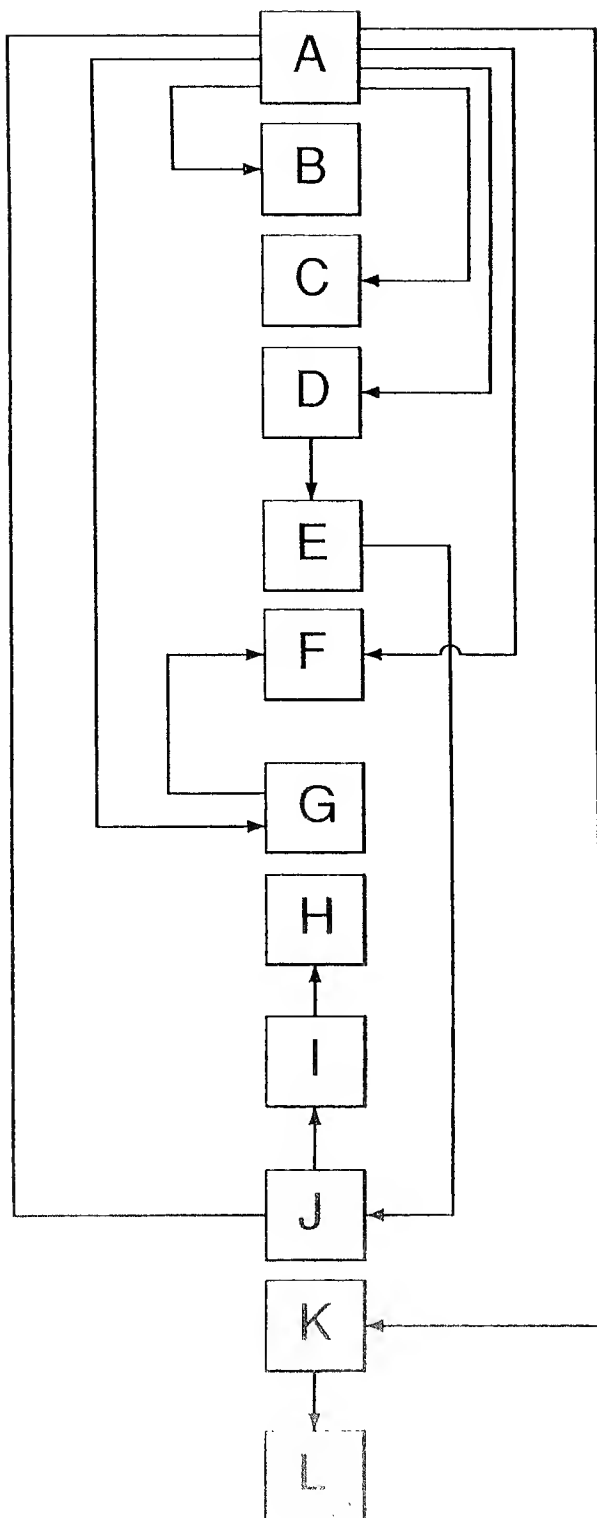


Fig. 18

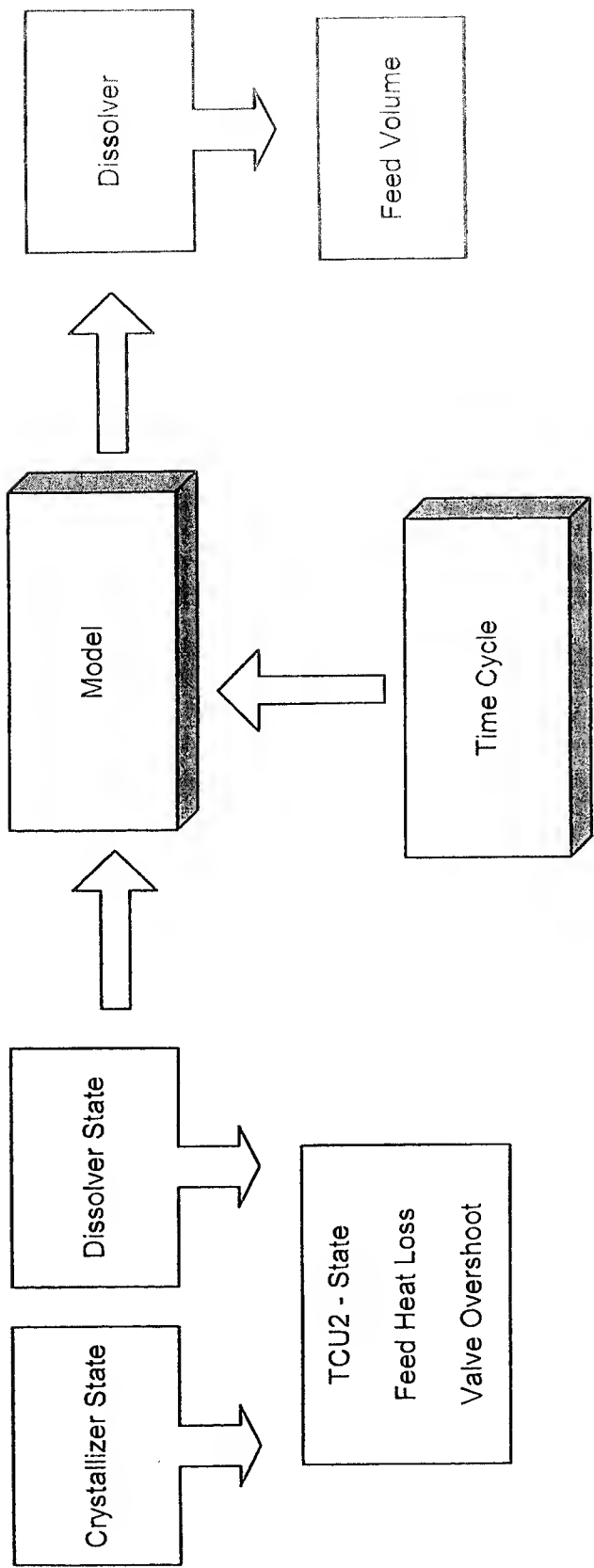
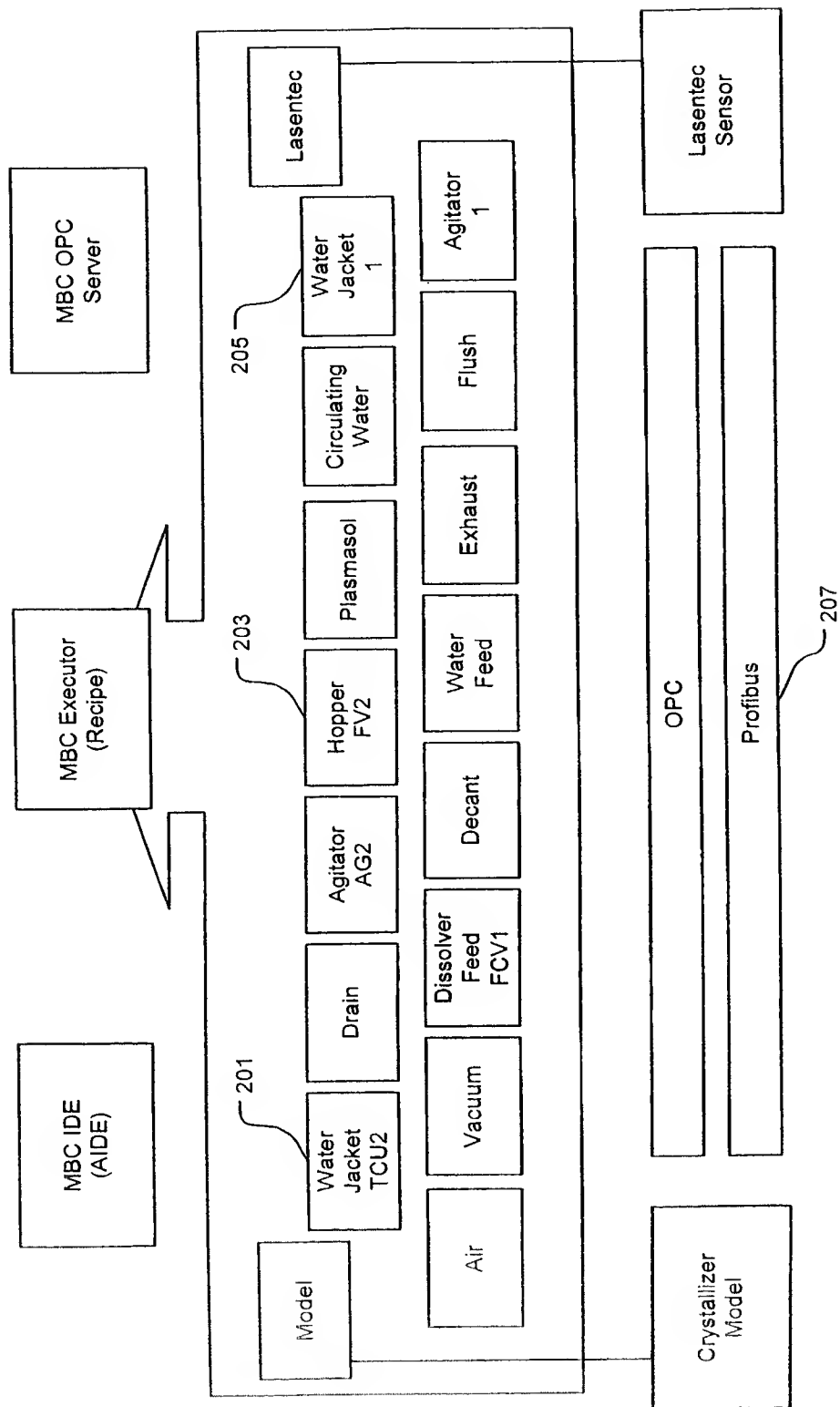


Fig. 19

Fig. 20



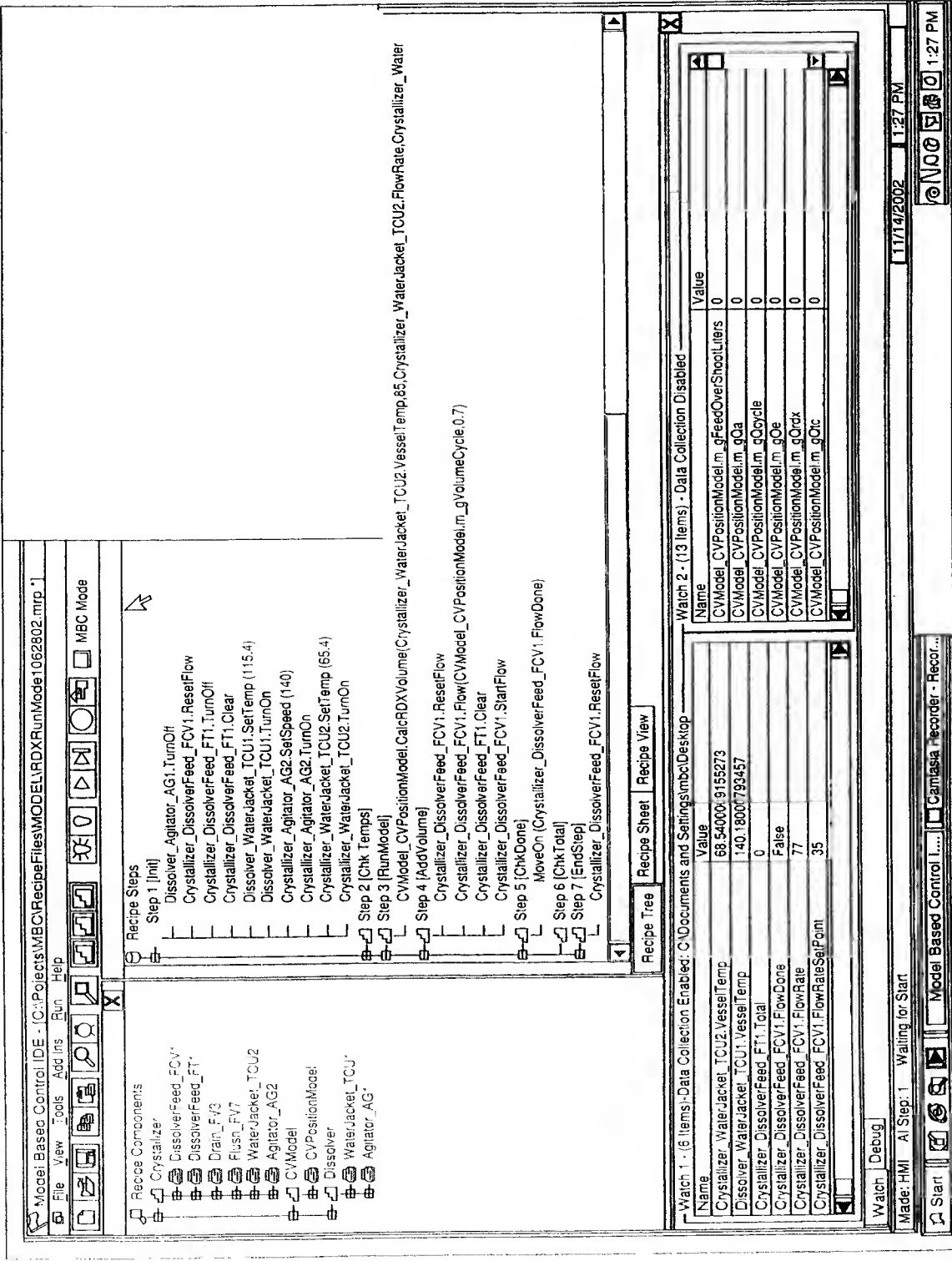


Fig. 21

Fig. 22

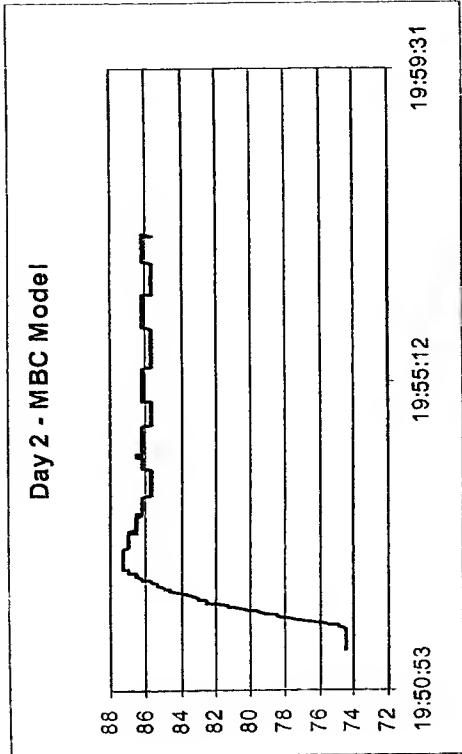
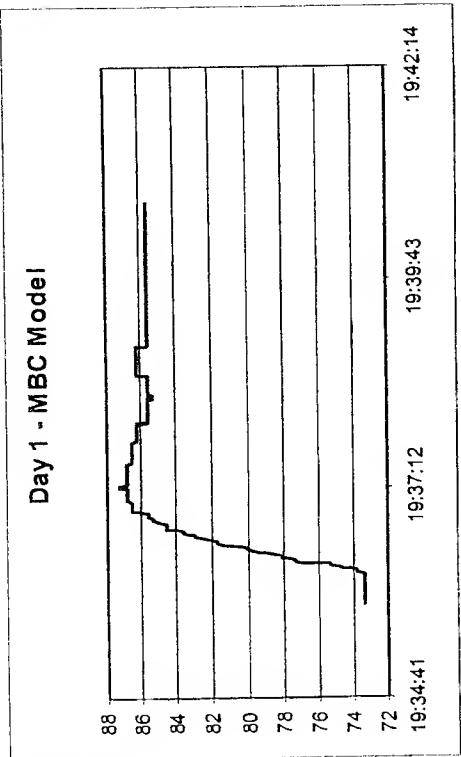
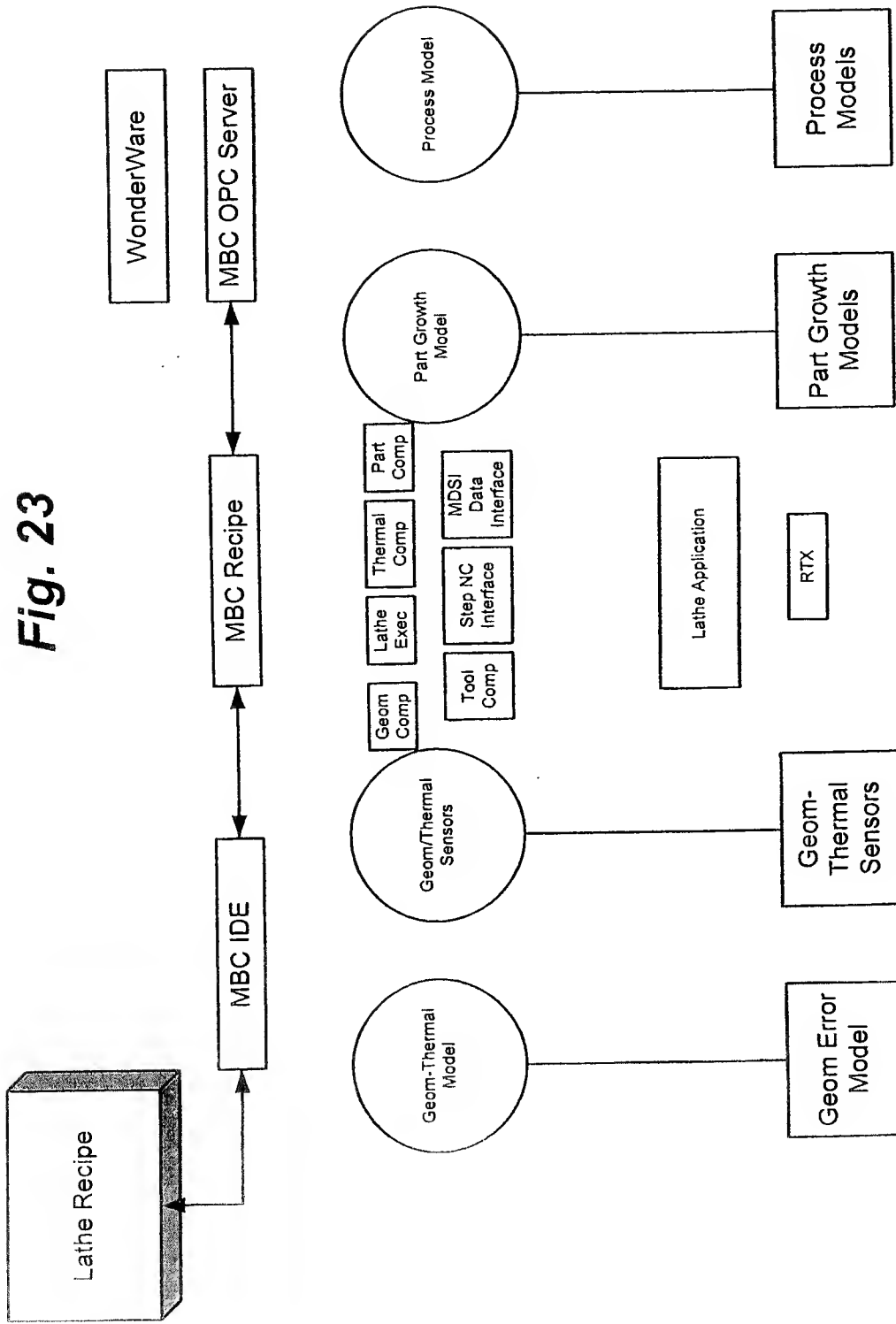


Fig. 23



Recipe View File Edit Recipe Window Help

Recipe Name
C:\Projects\MBC\Data\recipe First shot - Dave.xls

Recipe State
Waiting for Start

Date/Time
Wednesday, October 24, 2001 - 10:13:14 A

Recipe Step
1

Total Steps
6

Step Time
0

Total Time
0

Recipe Done
False

Keep Alive
True

Move On Function
MVWaterJacket1.Temp >= 58 And PVAgit

Loop
False

Loop Time
1000

Step Time
60000

Recipe Step Commands

```
PVAgitator2.SetPosition ("On")
PVAgitator2.SetSpeed (80)
PVWaterJacket2.SetPosition ("On")
PVWaterJacket2.SetTemp (30,1)
PVHopper.SetPosition ("Open")
MVAgitator1.SetPosition ("On")
MVWaterJacket1.SetPosition ("On")
MVWaterJacket1.SetTemp (58,1)
```

Recipe Step Code

```
Step 1
binGoOn = False
binRunLoop = True
Do
  If binRunLoop Then
    Call PVAgitator2.SetPosition ("On")
    Call PVAgitator2.SetSpeed (80)
    Call PVWaterJacket2.SetPosition ("On")
    Call PVWaterJacket2.SetTemp (30,1)
    Call PVHopper.SetPosition ("Open")
    Call MVAgitator1.SetPosition ("On")
    Call MVWaterJacket1.SetPosition ("On")
    Call MVWaterJacket1.SetTemp (58,1)
  End If
  If MVWaterJacket1.Temp >= 58 And PVAgitator2.RPM >= 80 Then binGoOn = TRUE
  If not binGoOn Then
    Call Sleep( 1000 )
    RunTime.RecipeStepTime = RunTime.RecipeStepTime + 1000
    RunTime.RecipeTotalTime = RunTime.RecipeTotalTime + 1000
  End If
  If RunTime.RecipeStepTime >= 60000 Then binGoOn = True
  binRunLoop = False
Loop While Not binGoOn
```

Mode HMI

Run Recipe

Run Recipe Step

Stop Recipe

Continue Recipe

Cancel/Reset Recipe

Start Data Collector

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Fig. 24

Item	Value
MBC.PVAgitator2.SpeedSetPoint	0
MBC.PVAgitator2.RPM	0
MBC.PVAir.OnSetPoint	0

Watch1 Watch2 Debug

Fig. 25

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DataCollector

Stats

File Time

Date

ID	Name	Type	R/W	Value
1	RecipeInterface.RunTime.RecipeStepIdx	Integer	R	0
2	MBC.PVAgitator2.SpeedSetPoint	Double	R	0
3	MBC.PVAgitator2.RPM	Double	R	0.000000
4	MBC.PVWaterJacket2.TempSetPoint	Double	R	0
5	MBC.PVWaterJacket2.Temp	Double	R	0.000000
6	MBC.PVDrain2.IsOpen	Boolean	R	False
7	MBC.PVHopper.IsOpen	Boolean	R	False
8	MBC.PVDisolverFeed.FlowRateSetPoint	Double	R	0
9	MBC.PVdisolverFeed.FlowRate	Double	R	0.000000

Storage

Time (ms) File

Fig. 26

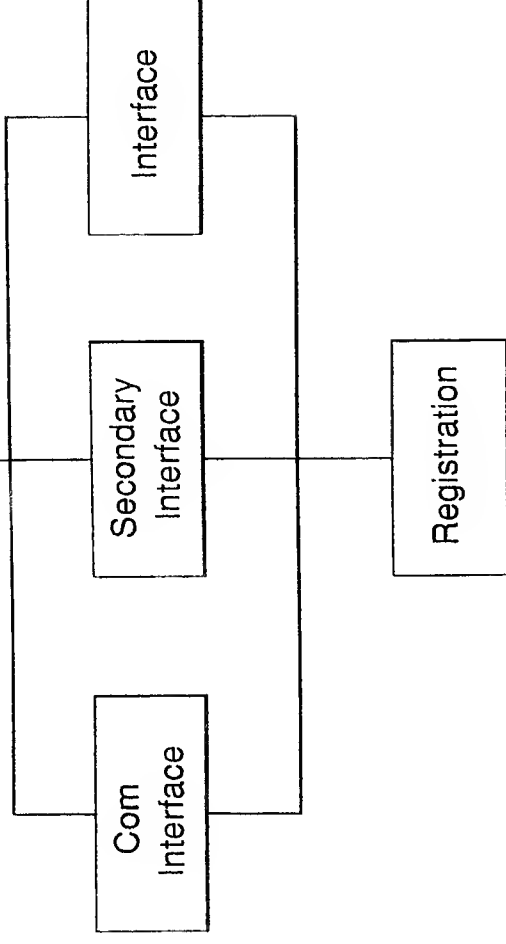


Fig. 27

Library	Component
MBC	PVAgitator2
MBC	PVWaterJacket2
MBC	PVDrain2
MBC	PVWaterFeed
MBC	PVHopper
MBC	PVDecant
MBC	PVDisolverFeed
MBC	PVFlush
MBC	MVAgitator1
MBC	MVWaterJacket1
MBC	PVExhaust
MBC	PVPlasmasol
MBC	PVAir
MBC	PVVacuum
MBC	PVCirculatingWater
MBC	PVAcetoneDosing
MBC	MVAir
MBC	MVHotWater
MBC	PVLasentec
MBC	OPCModel
MBC	OPCRuntime
Recipeinterface	RunTime
Model	TBD

Fig. 28

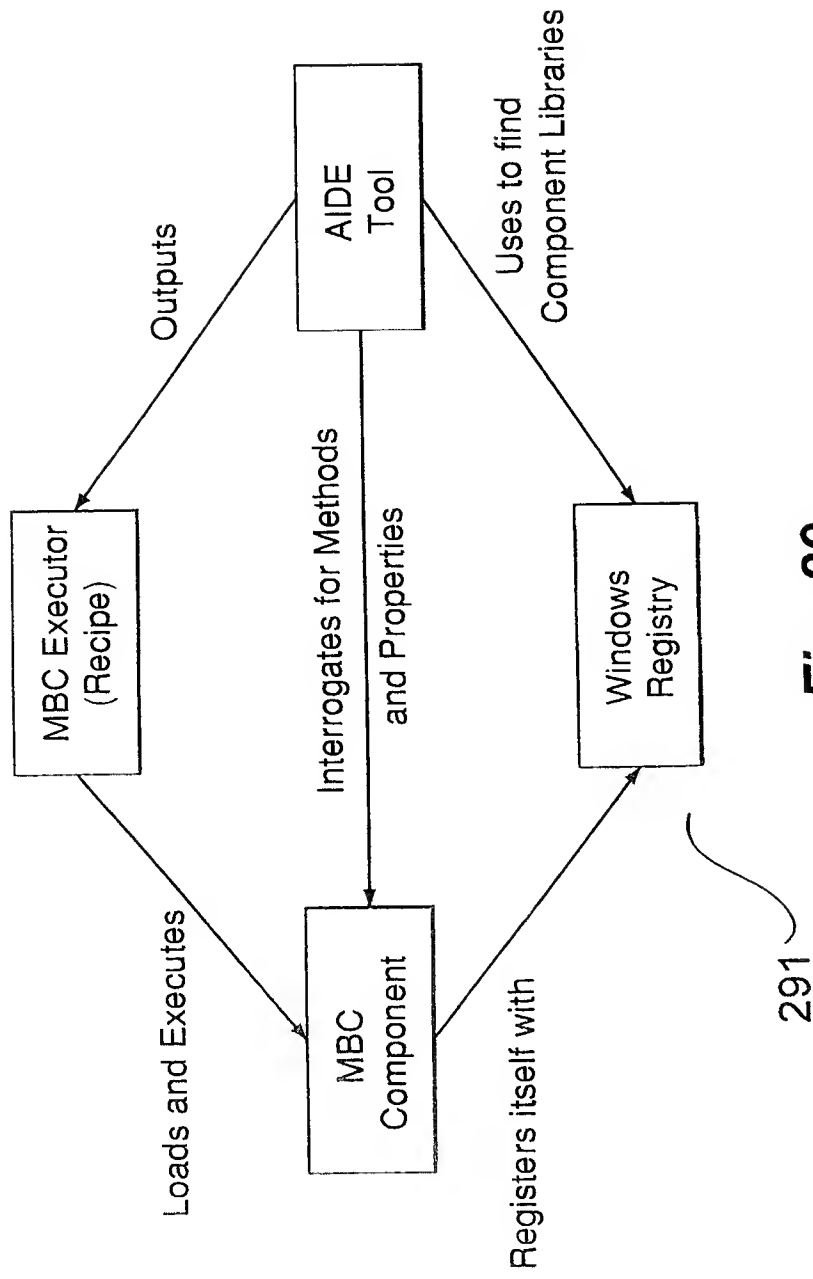


Fig. 29

Fig. 30

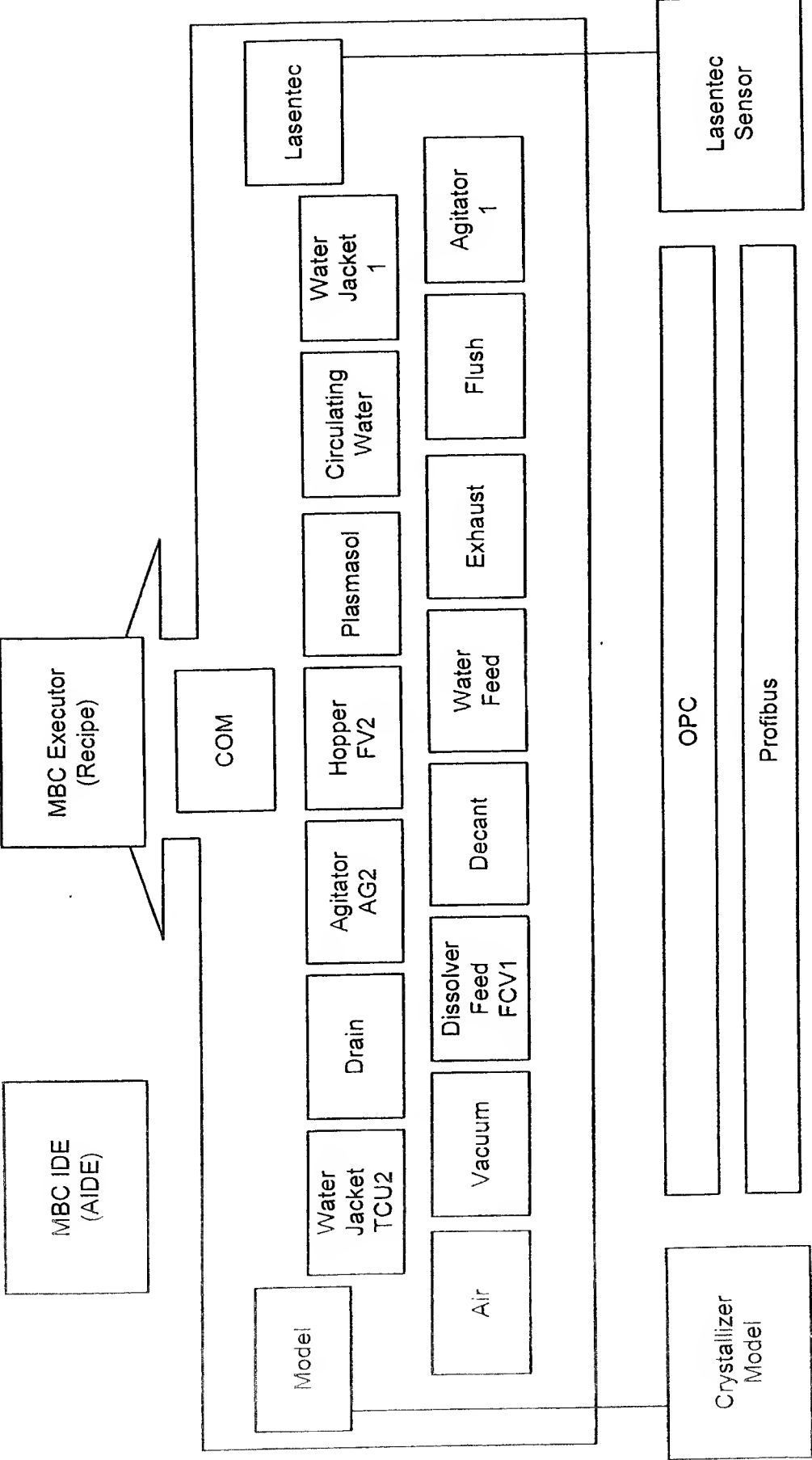


Fig. 31

311

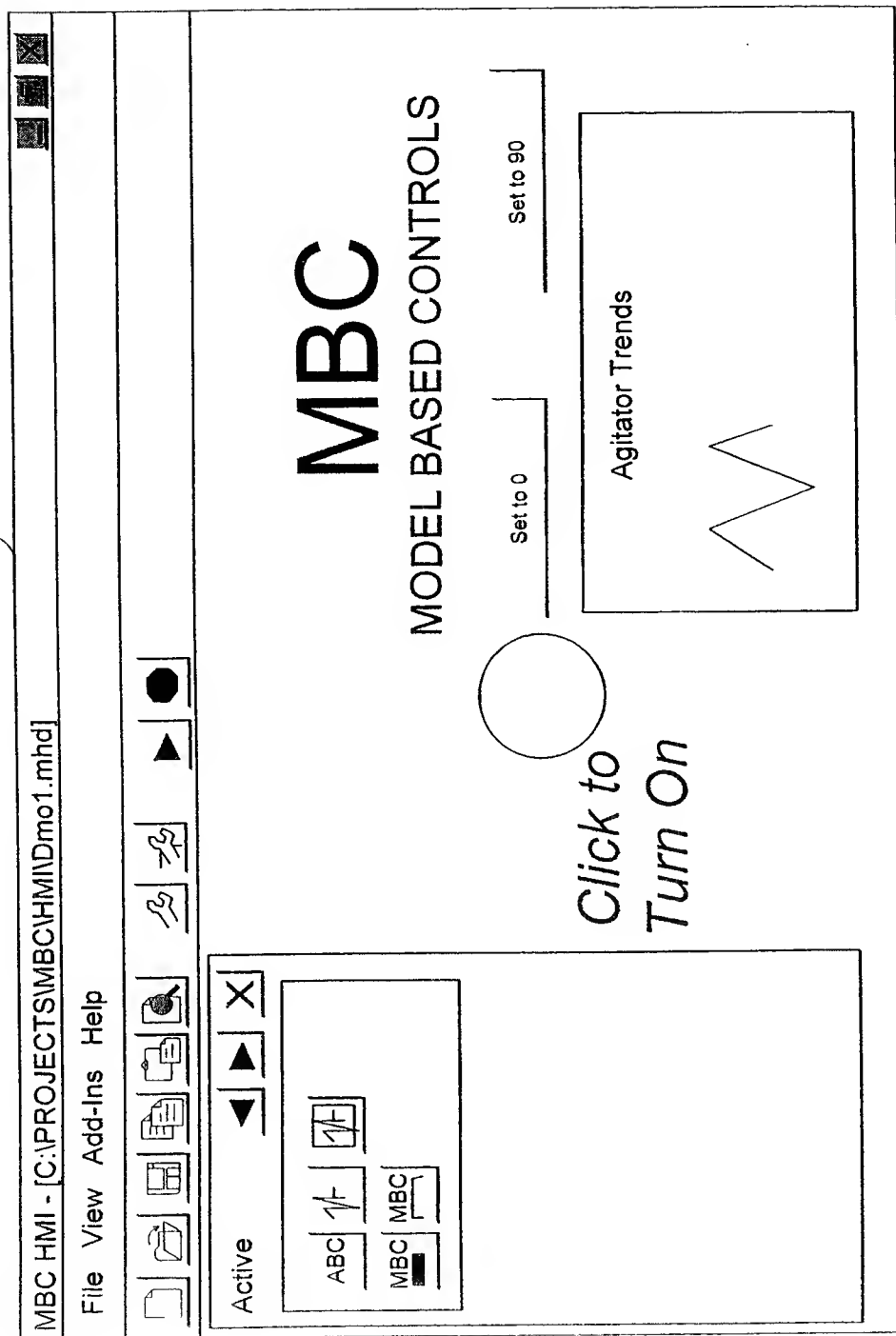


Fig. 32

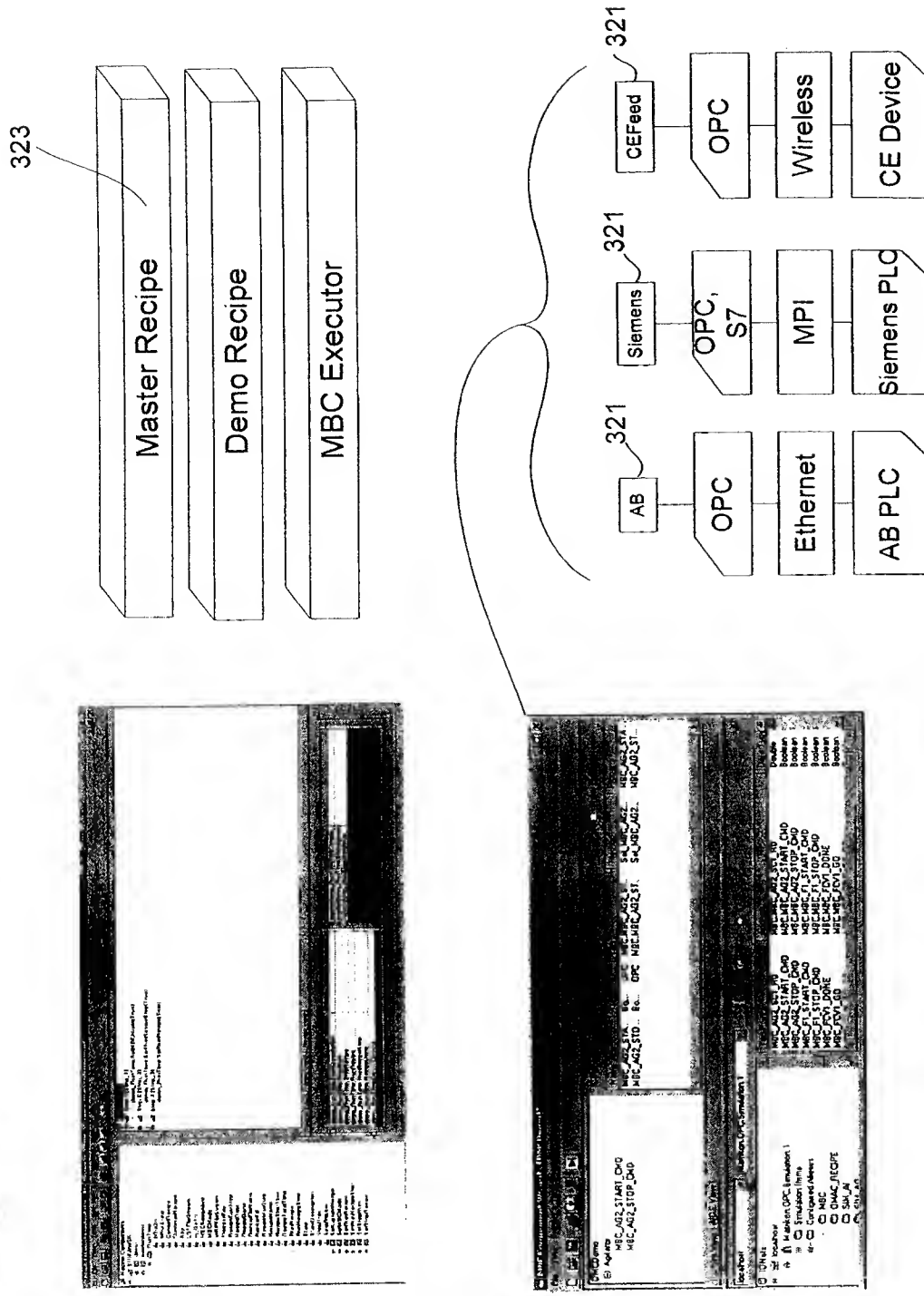
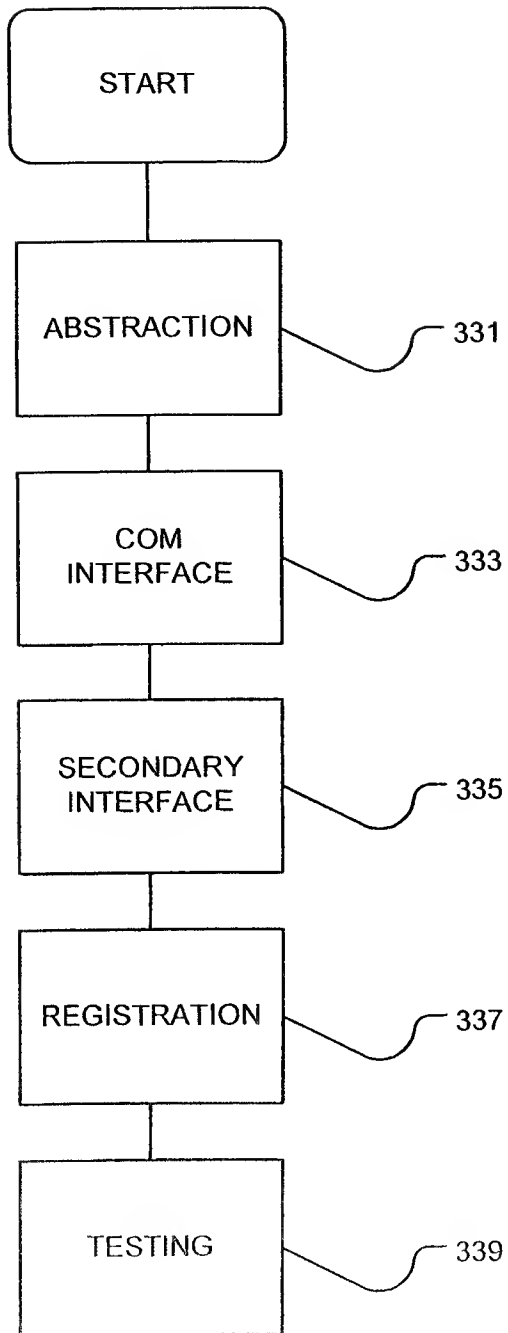


Fig. 33



IComponent
<ul style="list-style-type: none">◆ ComponentName : String◆ IOPointList : Collection◆ State : Integer◆ StateName ; String
<ul style="list-style-type: none">◆ SaveConfig()◆ LoadConfig()◆ ValidateCommand()◆ Initialize()◆ Reset()

341

Fig. 34

clsIOPoint
<ul style="list-style-type: none"> ◆ Component : String ◆ Name : String ◆ IOType : String ◆ Tag : String ◆ Handle : Long ◆ Value : Variant ◆ Quality : Long ◆ TimeStamp : Long ◆ ValueRange : String ◆ InitialValve : Variant ◆ CanInitiate : Boolean ◆ ScaleFactor : Double ◆ Threshold : Long
<ul style="list-style-type: none"> ◆ Equals() : Long ◆ IsEqual() : Boolean

351

Fig. 35

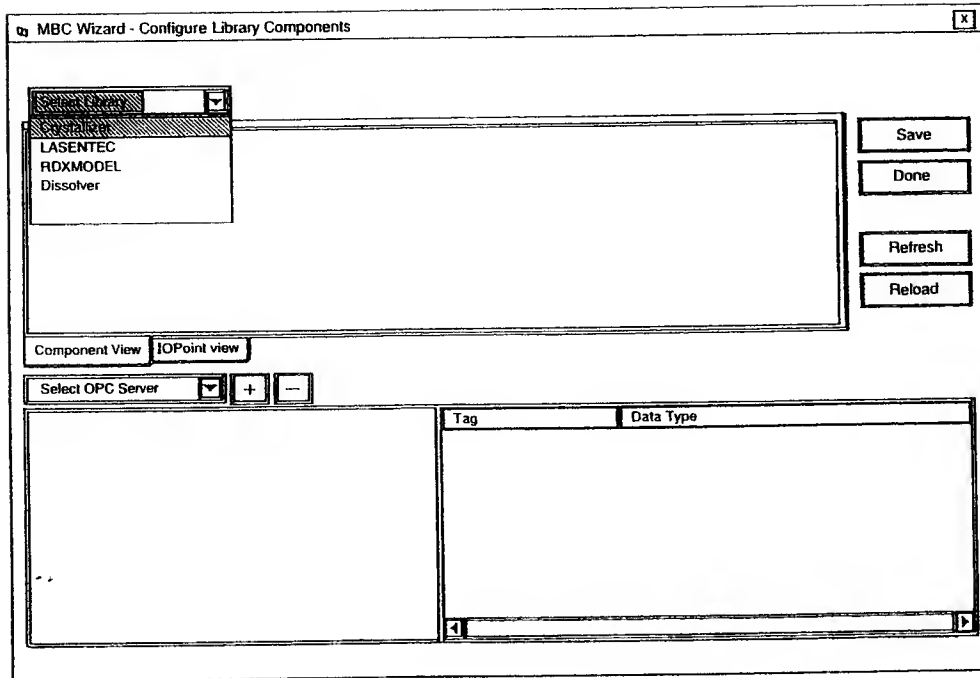


Fig. 36

371

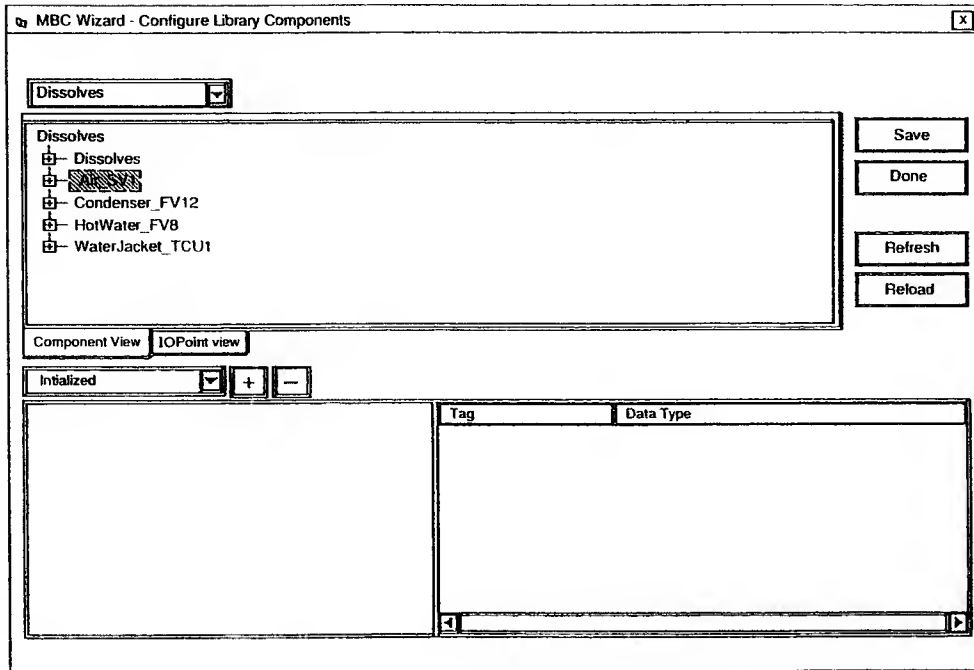


Fig. 37

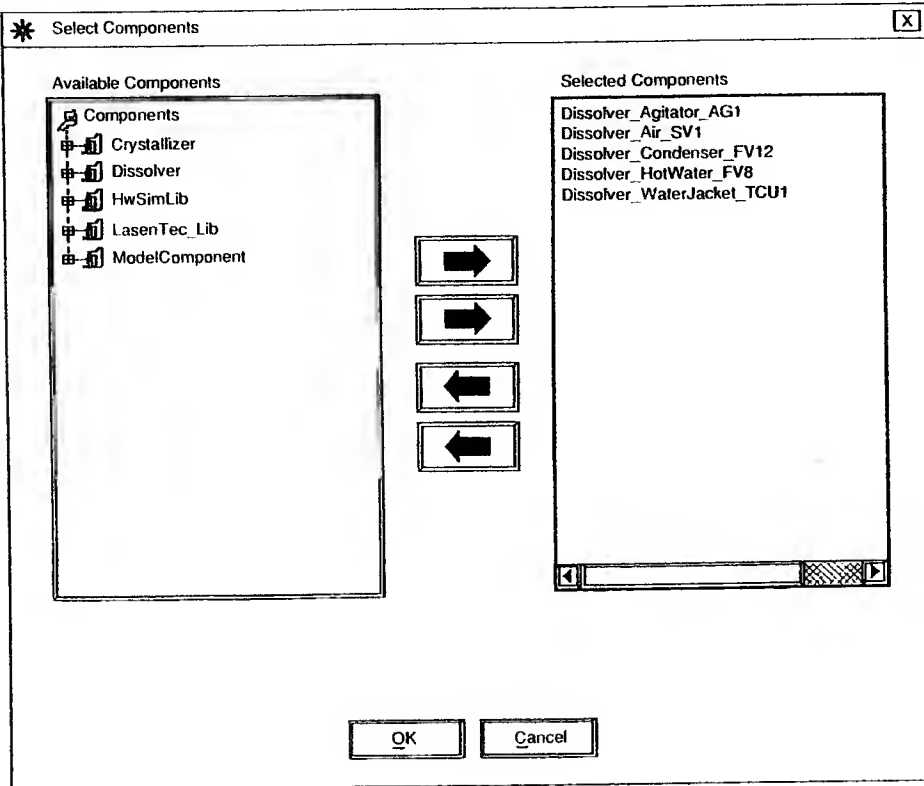


Fig. 38

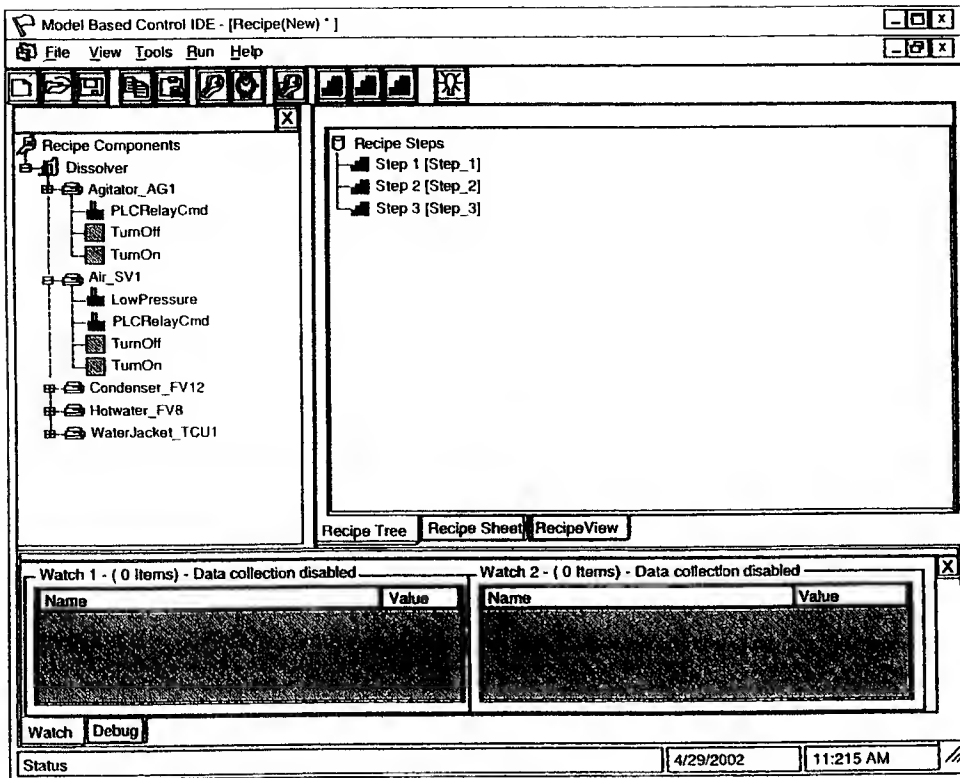
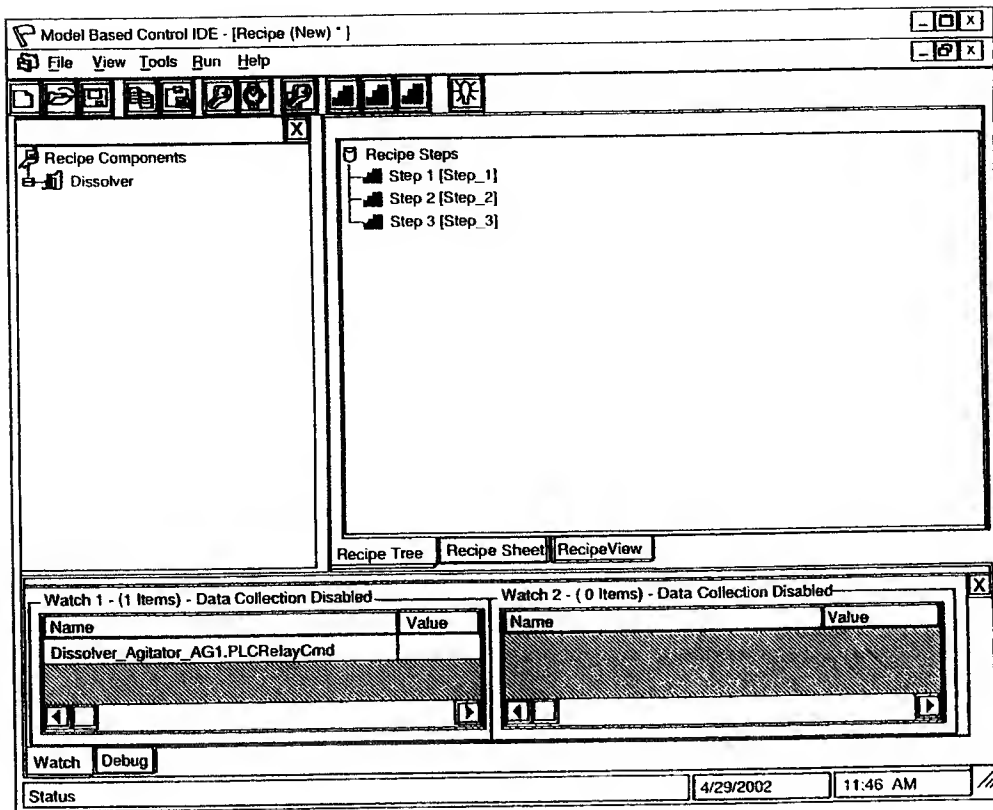


Fig. 39

*Fig. 40*

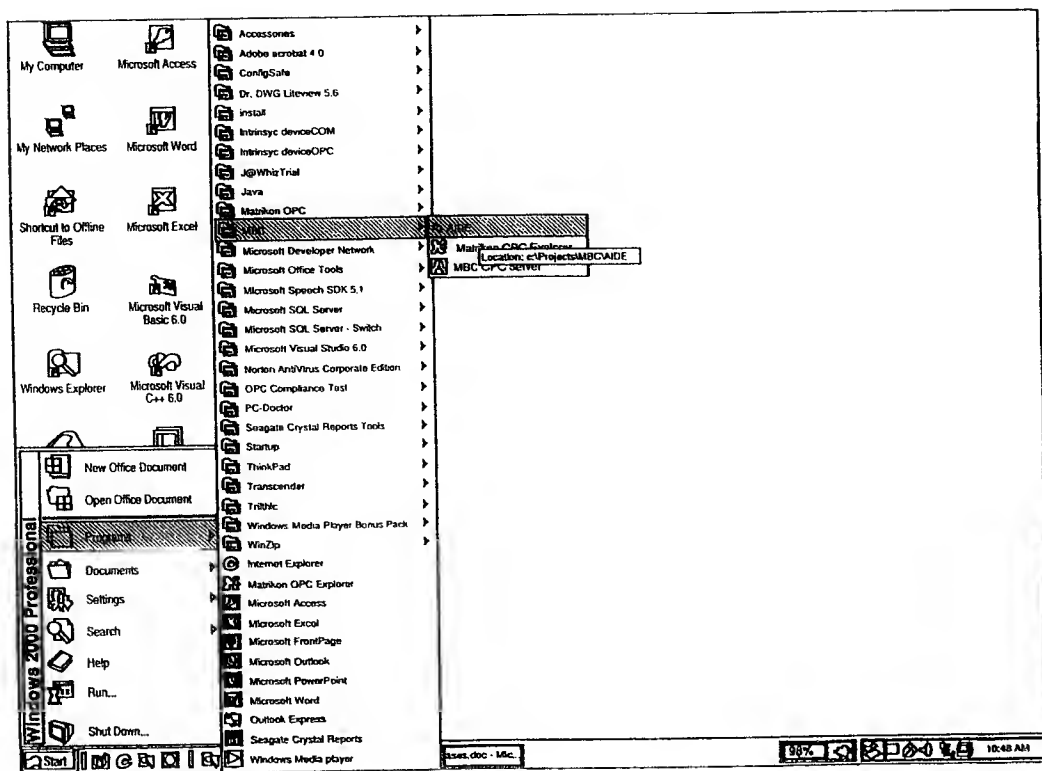


Fig. 41

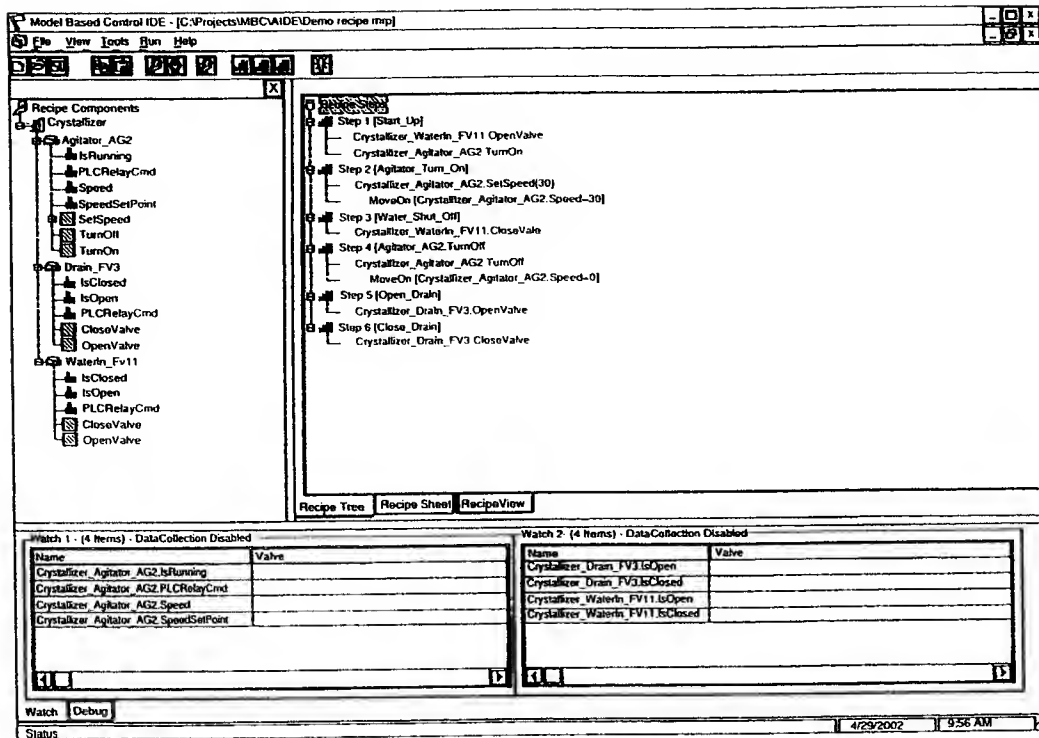


Fig. 42

431

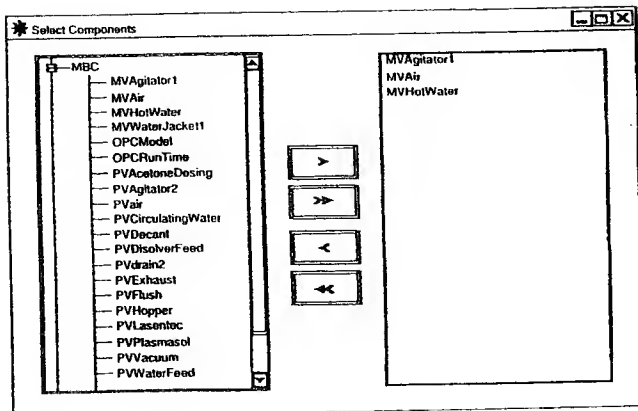
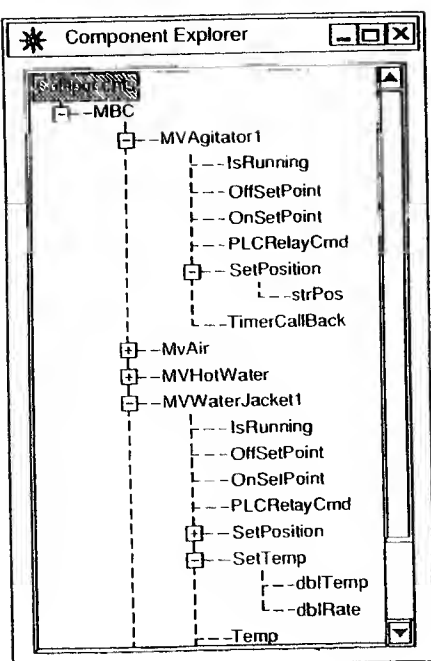
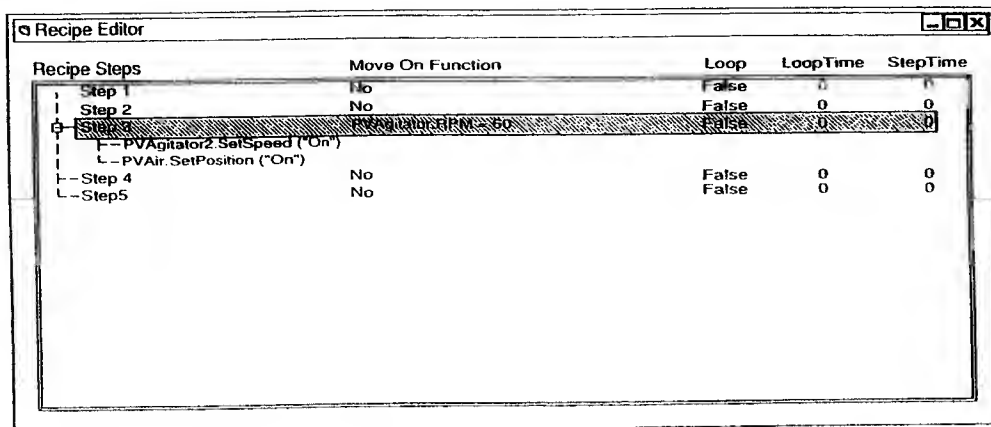


Fig. 43



441

Fig. 44



Recipe Steps	Move On Function	Loop	LoopTime	StepTime
Step 1	No	False	0	0
Step 2	No	False	0	0
Step 3	PVAgitator2.SetSpeed ("On")	False	0	0
Step 4	PVAir.SetPosition ("On")	False	0	0
Step 5	No	False	0	0

Fig. 45

Recipe Step Detail

Step No: Description:

☐ Pre-Process Step

☐ Post-Process Step

Component Commands

MBC.PVAgitator.SetPosition("ON")

MBC.PVAgitator.SetSpeed(60)

MBC.PVAir.SetPosition("Open")

Loop Control

Move On:

Loop Time:

Step Time: Units: Loop: ☐

Fig. 46

Fig. 47

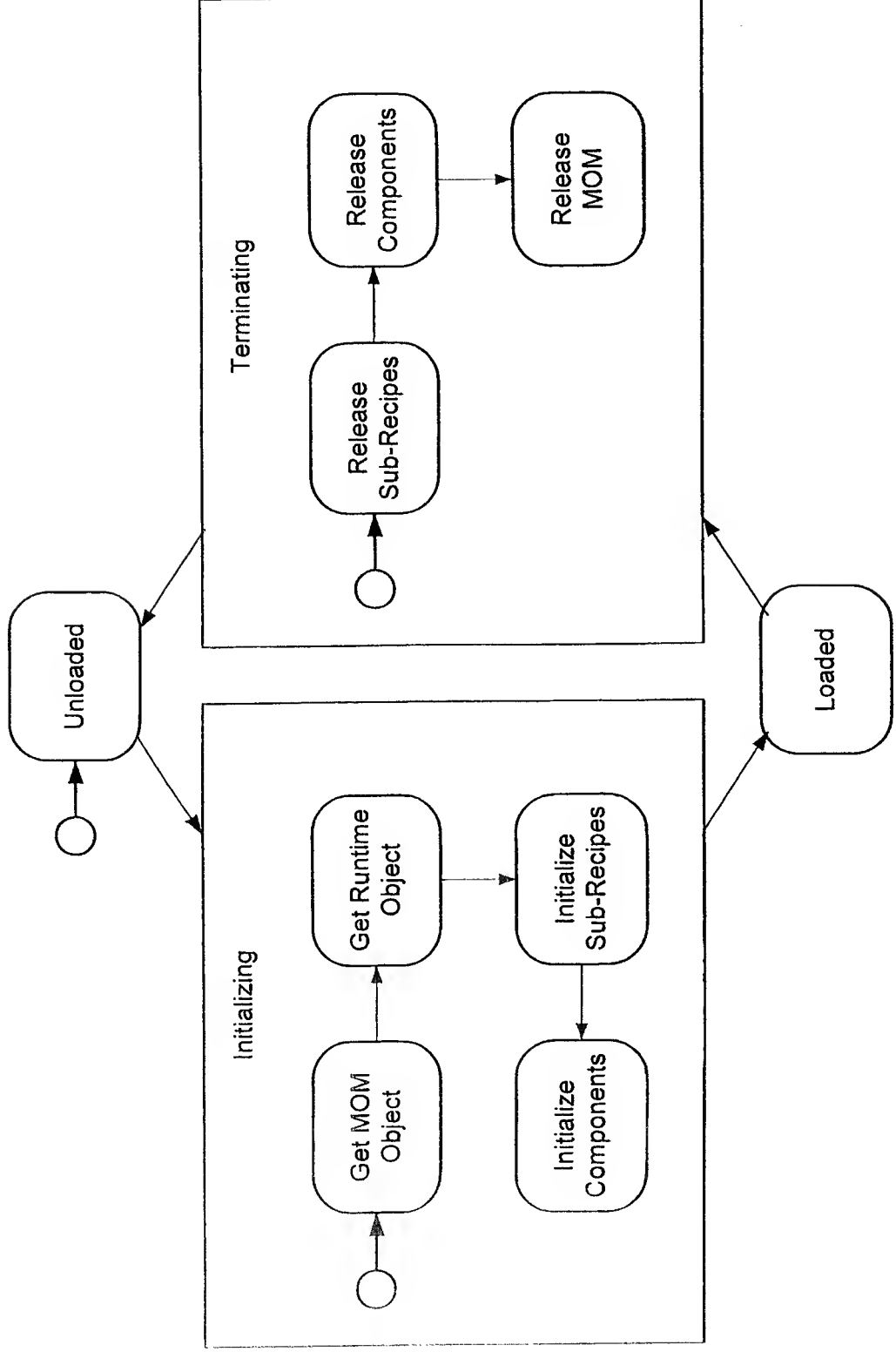


Fig. 48

Loaded

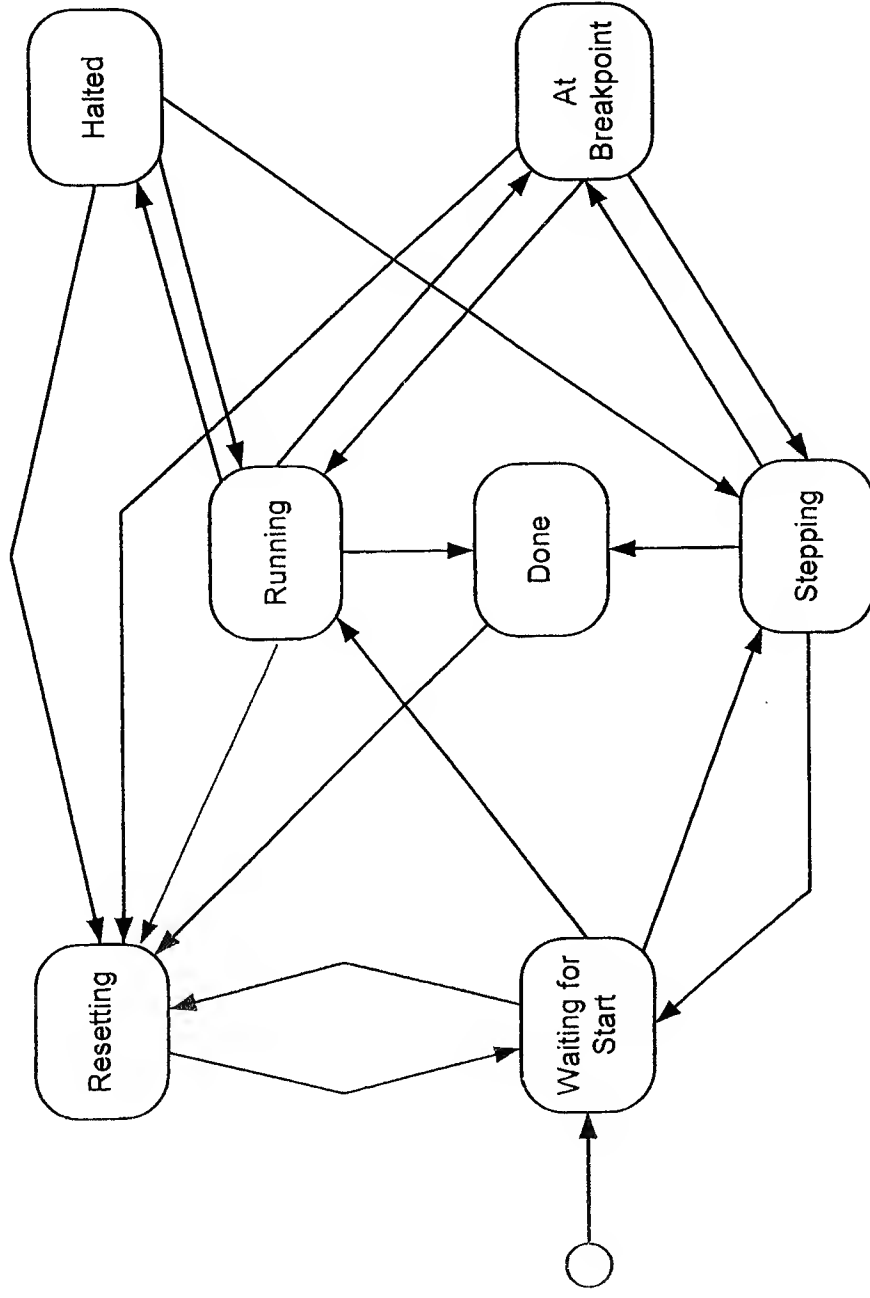
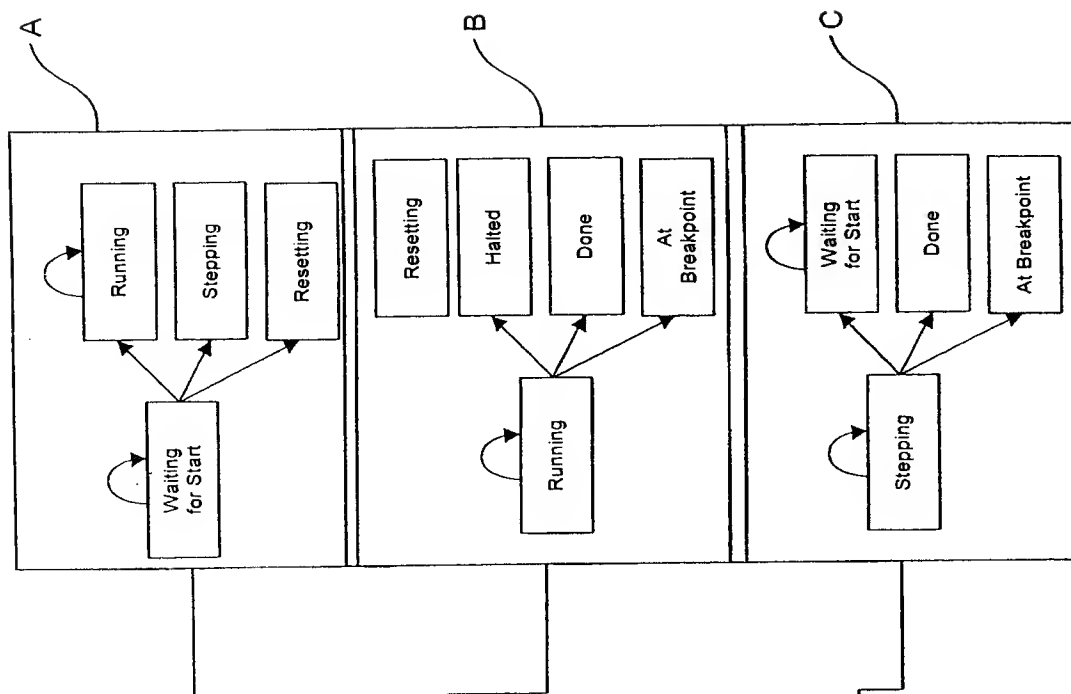
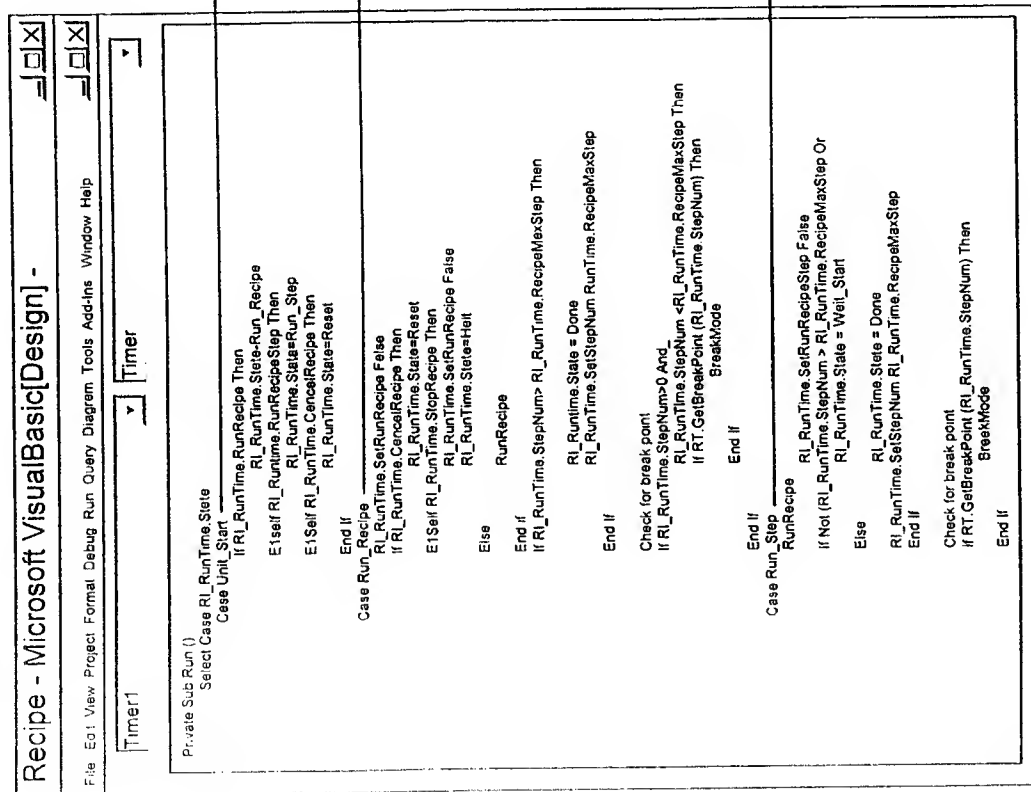


Fig. 49



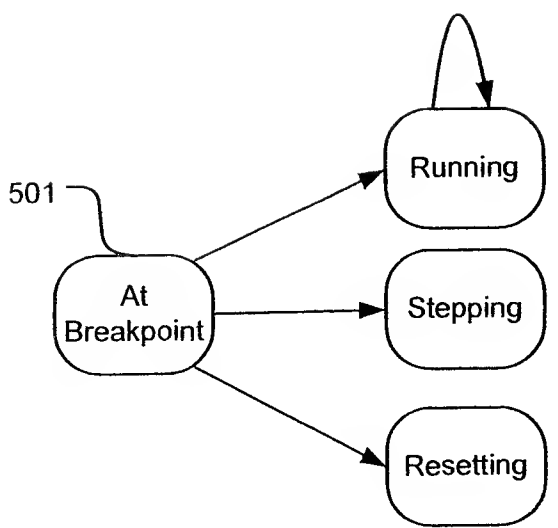


Fig. 50

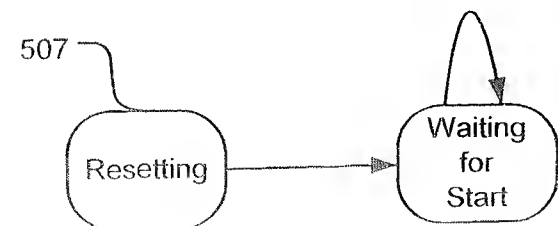
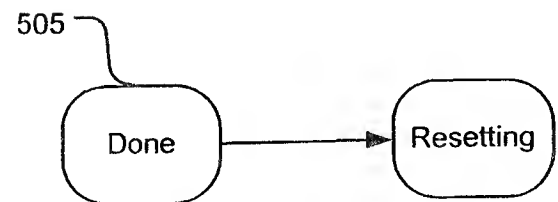
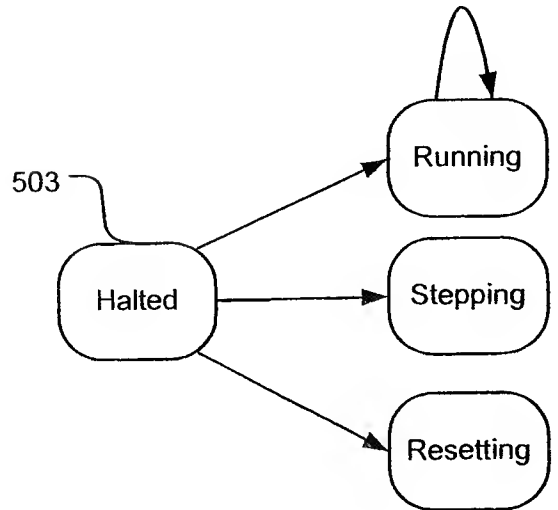
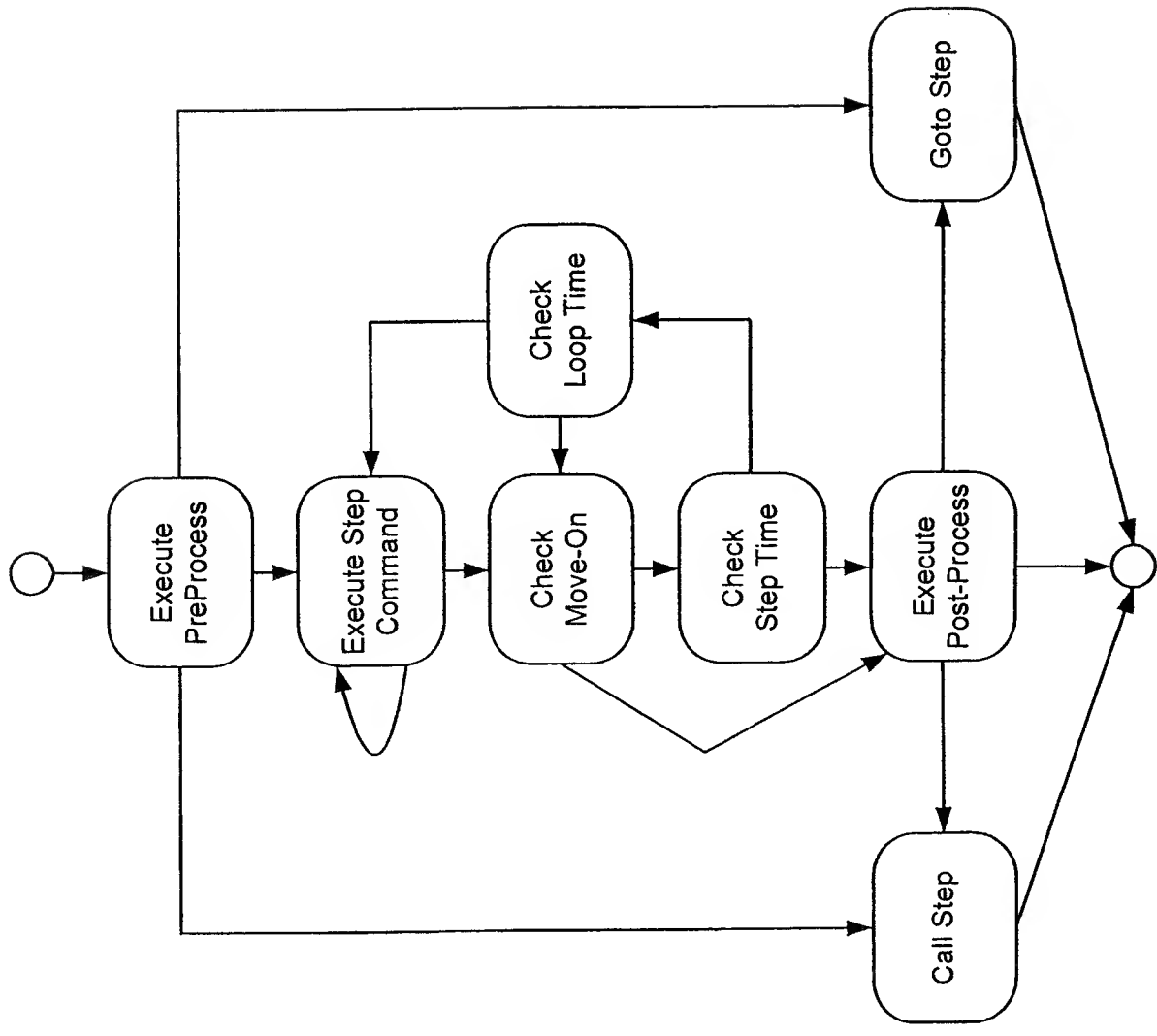


Fig. 51



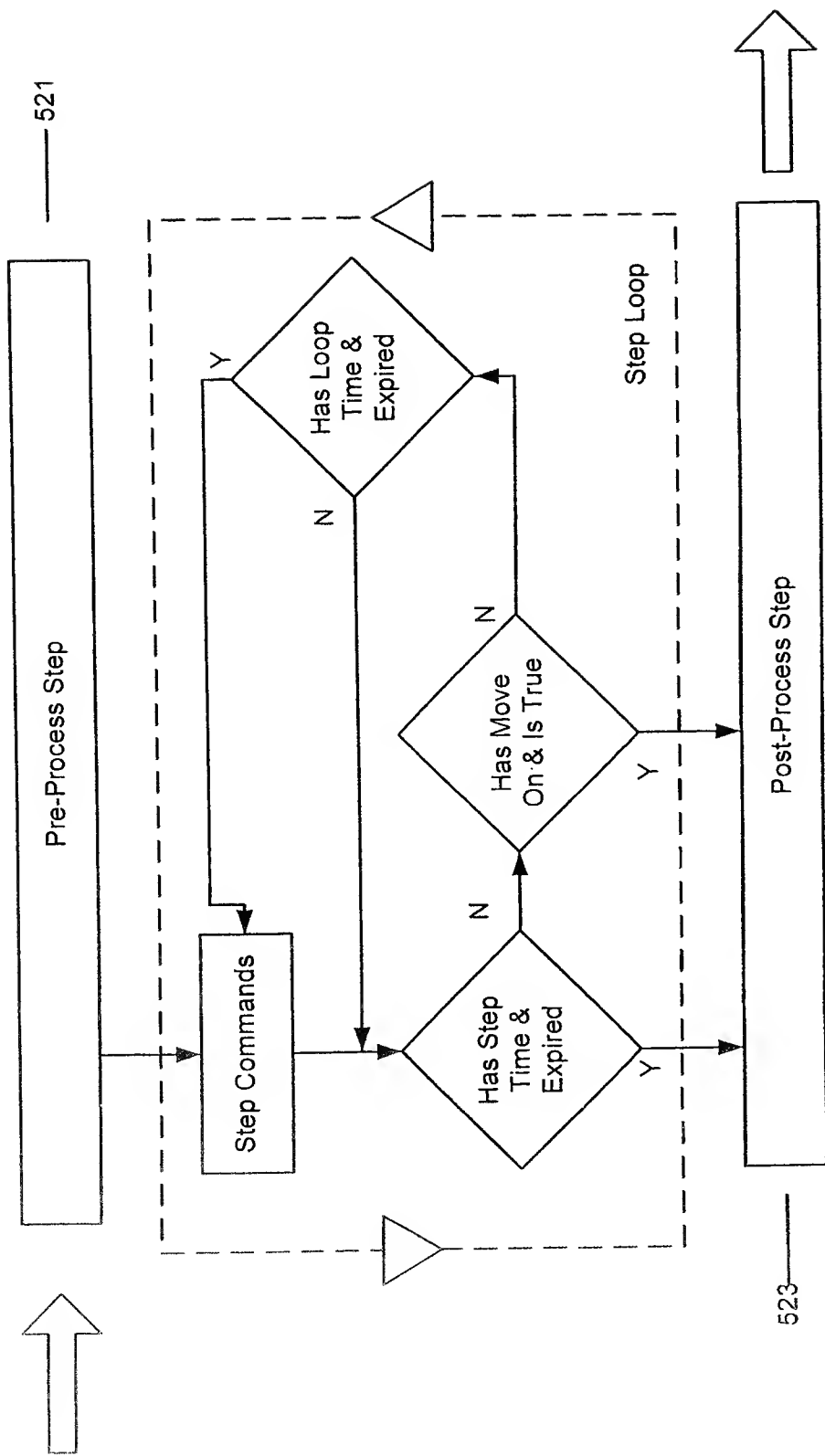


Fig. 52

The diagram shows a 'Recipe Step Detail' window. It contains several input fields and buttons:

- Step No.:** A text box containing the number '1'.
- Name:** A text box containing 'Step_1'.
- Description:** A large text area.
- Pre Process:** A text area containing the code:


```
If M_Mike_LAPTOP_Crystallizer_Drain_FV3.IsOpen Then
  GotoStep "Step_2"
EndIf
```
- Post Process:** A text area containing the code:


```
If M_Mike_LAPTOP_Crystallizer_Drain_FV3.IsClosed Then
  GotoStep "Step_3"
EndIf
```

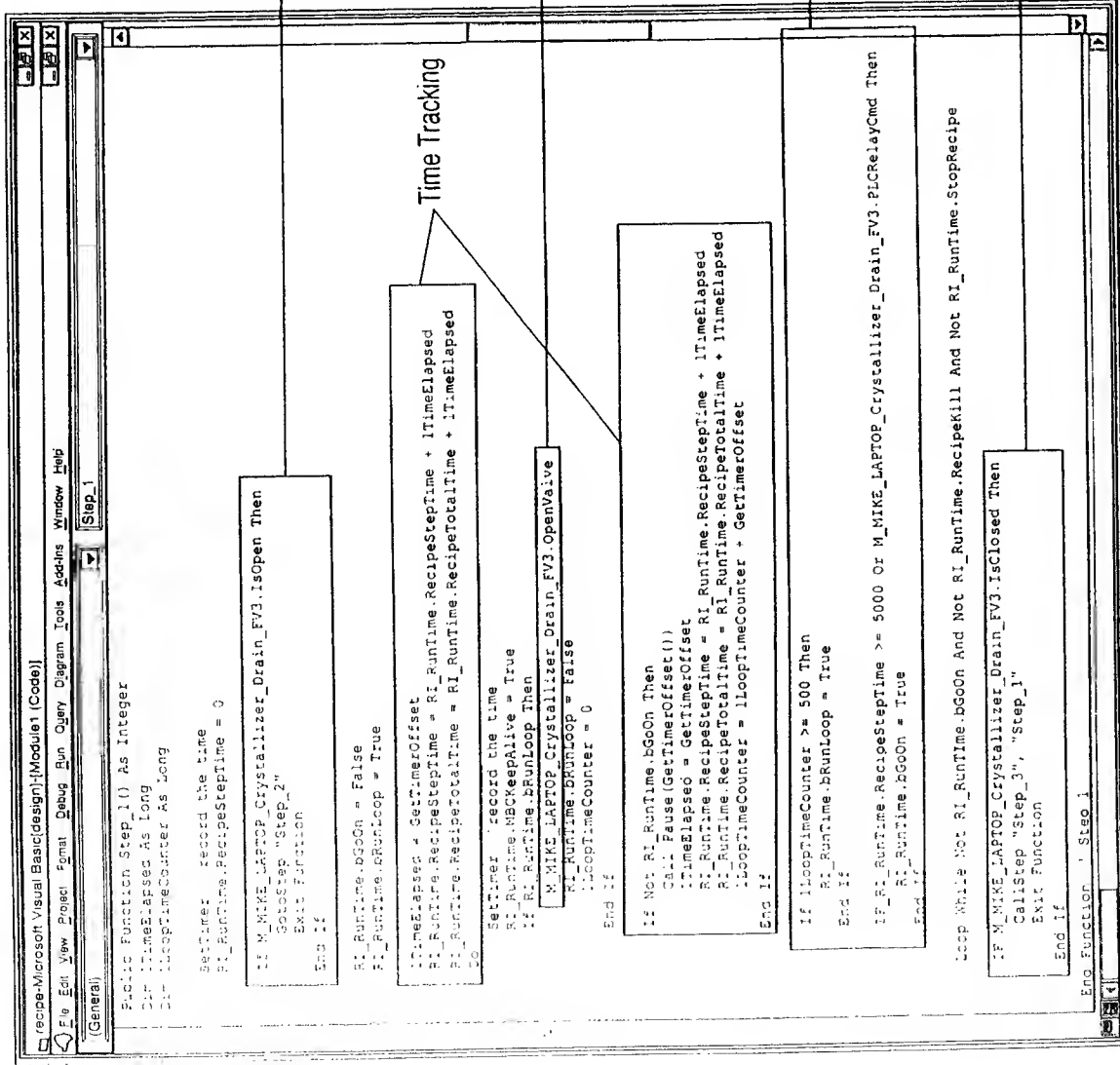
Buttons labeled 'OK', 'Apply', and 'Cancel' are at the bottom. Buttons labeled 'First', 'Prev', 'Next', and 'Last' are on the right. An 'EXP' button is next to the Pre Process field.

A callout box labeled '535' provides a detailed view of the 'Loop Control' section, which includes:

- Move On:** A text box containing 'M_MIKE_LAPTOP_Crystallizer_Drain_FV3.IsOpen'.
- Loop Time:** A text box containing '500' and a unit dropdown menu set to 'msec'.
- Step Time:** A text box containing '5000' and a unit dropdown menu set to 'msec'.

Another callout box labeled '537' points to the 'Step Time' field. A third callout box labeled '538' points to the 'Loop Time' field. A fourth callout box labeled '539' points to a scrollable list box containing 'M_Mike_LAPTOP_Crystallizer_dra'.

Fig. 54



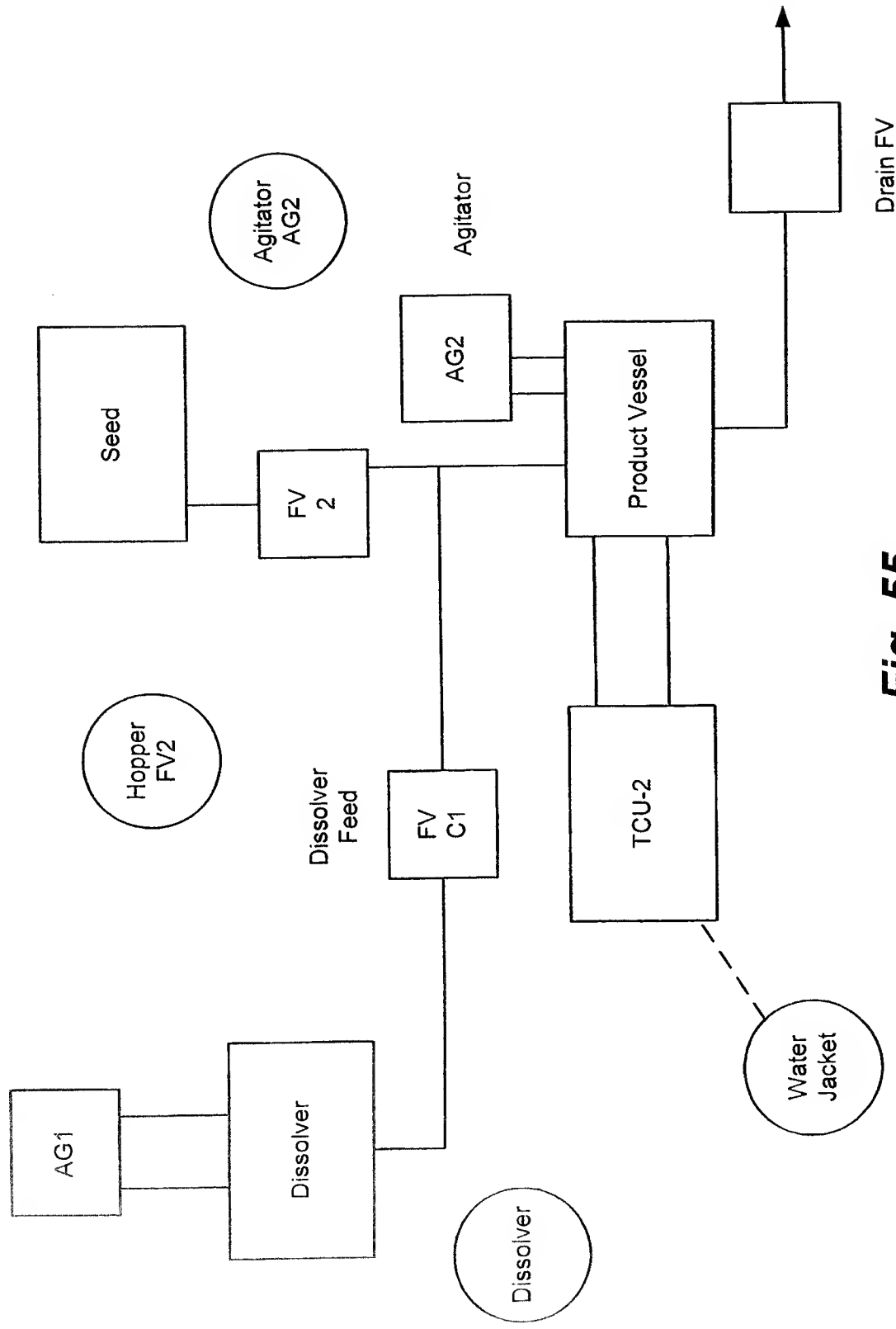


Fig. 55

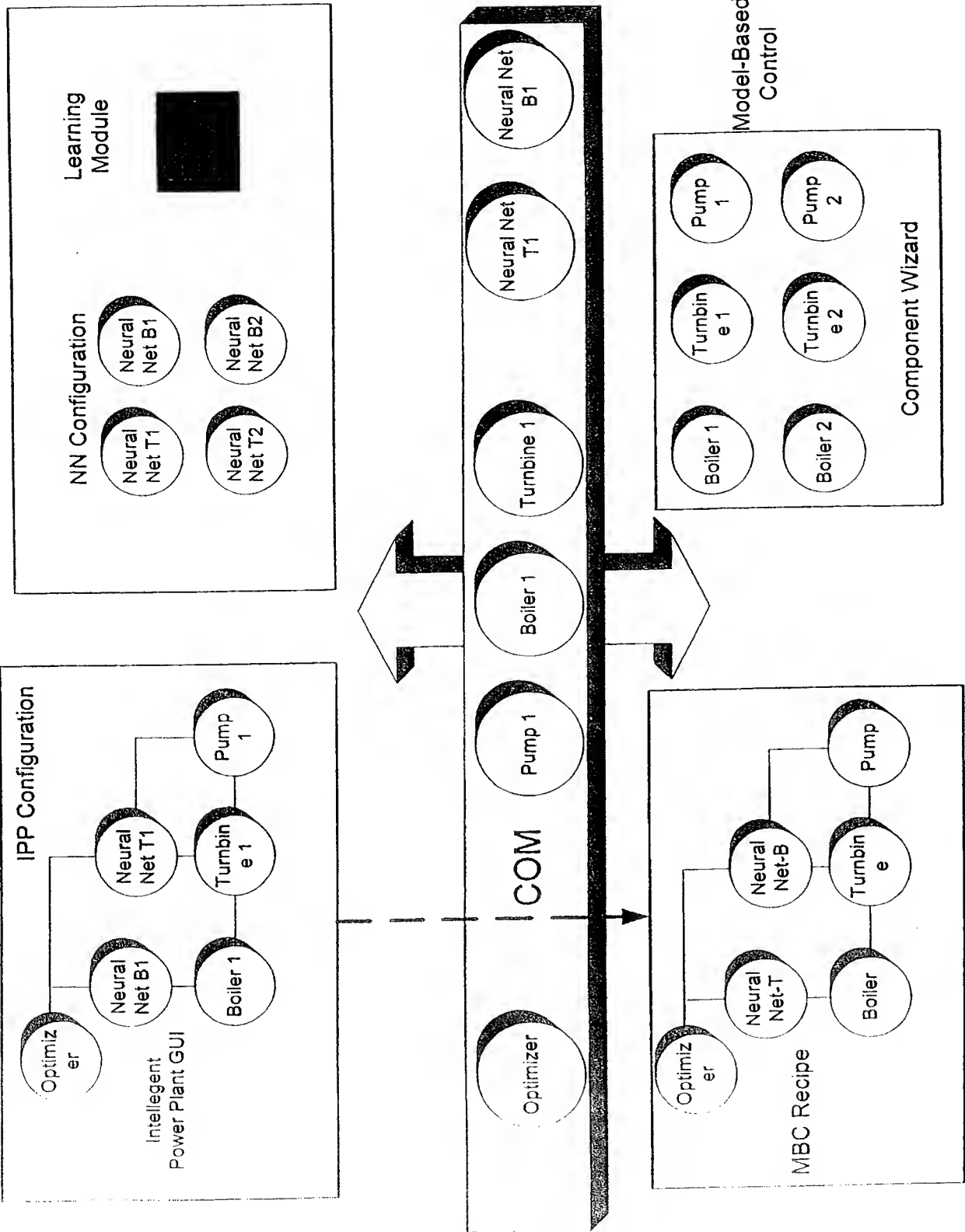
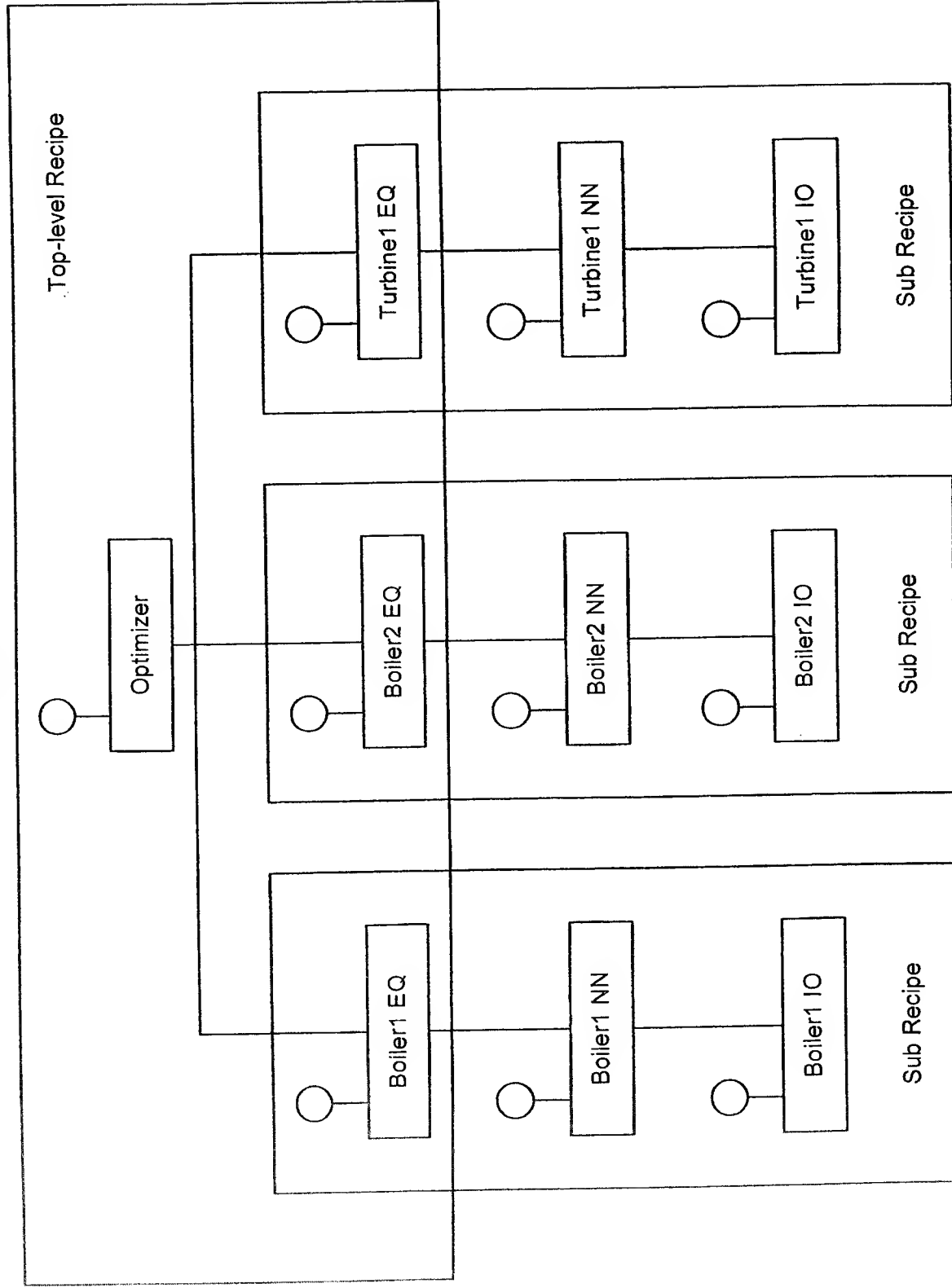


Fig. 56

Power Plant

Fig. 58



MBC DC IOMServer Control Panel

DC IOMServer Configuration File

C:\Projects\Testbeds\MBCDCSim Testbed\MBCDCSim.exe.config Open Save

Data Collection File

C:\Projects\Testbeds\MBCDCSim Testbed\MBCDCSim\dctestfile.csv Browse

Mode Interval State Step

Auto 500 Running 9

Auto Manual Load Unload Step Run Stop Reset

Data Collection Items

RecipeInterf	RecipeInterf	RecipeInterf	RecipeInterf	AtrainData	AtrainData	AtrainData	AtrainData	AtrainData	AtrainData
RunTime	RunTime	RunTime	RunTime	Datum	Datum	Datum	Datum	Datum	Datum
StateDescrip	RecipeTotal	Recipe Step	StepNum	HOUR	HUMID	SOLAR	TEMP	WBCW	WBE
Running	2434	2323	2	7	5.68	498.09	0	0	

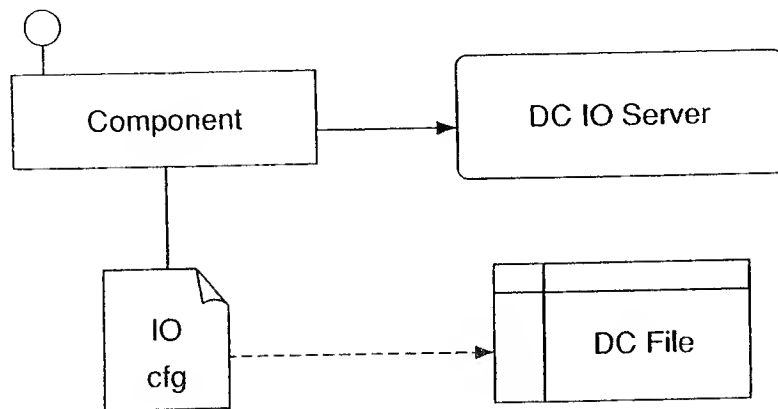


Fig. 59